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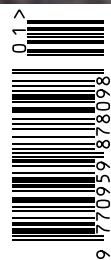
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UP FRONT

Legislation has forced Porsche down the turbo route, but, as ever, it's made a virtue from a necessity. Bad news sells as we continue to investigate M96/M97 engine issues

The evolution of the 911 continues. At 52 years and counting, this engineering and design excercise has become a barometer of automotive thinking, one that can be dated rather like geological strata. Steel and alloy contruction – that will be the '60s and '70s. Traces of silicone? Welcome to the '80s and computing. Composites and interconnected electronics? The '90s and beyond. All of the above, plus extensive use of turbochargers? That will be right now.

Yes, the 991 Gen 2 is with us and with it the demise of the normally aspirated flat-six, as 3-litre twin-turbo engines take

“The 911 has become a barometer of automotive thinking”

over. The GT3 gets a special dispensation, but otherwise, just as rules and regs killed the air-cooled flat-six, then so they have the N/A engines. Making a virtue out of a necessity, Porsche has used the opportunity to change the dynamic of the 911. Torque is now the dominating force and the Carrera 2S features near identical performance figures to the 996 Turbo. Remember the impact that had 15-years ago? What do we think of the 991 Gen 2? Head to p42 and find out.

Elsewhere, we've returned to a subject that *911&PW* is rather renowned for: the M96/M97 issue. This isn't a case of bad news sells, but more a case of forewarned is forearmed.

There's all sorts of thinking surrounding the very real woes. Our aim is to cut through that and deliver the facts and the fixes.

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NEWS

Is a stripped-out, manual-only 911R on its way? Porsche gets dragged in to the diesel scandal, record sales figures, plus new Macan GTS and Porsche wins the WEC



PORSCHE PREPS MANUAL-ONLY 911 'R' FOR PURISTS

Low-volume special to get GT3 engine and manual 'box for maximum involvement



It's the rumour that just won't die. Now we have the images to prove it's really happening. Porsche is prepping a manual-only 911 for purists and it will likely be known as the 911R. The last 911 to carry the 911R moniker was the ultra-rare and ultra-light competition car of 1967.

Nothing is official at this stage. But the basic outline of the new model is taking shape. Based on the narrow body 991-series shell as opposed to the wide body alternative, the early development mule seen here sports 991 GT3 bumpers and wheels, the latter complete with centrelock hubs. It's not clear if the new model is part of the outgoing first-generation 991 family or if it will acquire some or all of the cosmetic and technical tweaks from the recently updated second-generation 991.

Either way, underneath there's thought to be a derivation of the high-revving atmospheric engine found in the 991 GT3 and GT3 RS models. Whether

it's in 3.8-litre or 4.0-litre trim and knocking out the same power or somehow retuned isn't certain. But the smart money is on a slightly detuned 3.8 from the GT3 with roughly 450hp. What these images do prove, however, is that the aero concept for this modern-day 911R is distinct from the GT3 models.

Immediately apparent is the removal of the GT3's signature rear wing. Less obvious but every bit as significant is the presence of an aerodynamic diffuser under the rear of the car. Historically, the 911's rear engine location has made the use of diffusers tricky. So it will be interesting to have a closer look at how Porsche has leaped that technical hurdle.

Whatever shape the diffuser finally takes, it'll be a first on any series-production and road-legal 911 and indicates that maintaining downforce and, in turn, high performance and grip levels are at least part of the new 911R package. The production version may also sport a ducktail

spoiler as opposed to the standard 991 flip-up wing seen here.

Elsewhere, highlights are thought to include the aforementioned manual-only transmission option along with what are said to be slightly smaller tyres than the GT3. The significance of the latter point involves more accessible limits and a playful balance in contrast to the outright grip-maximisation and lap time-optimisation of the latest GT3 models. Though the 'R' will clearly be an extremely rapid car, it will also be as much about involvement as pure speed.

With that in mind, it will be intriguing to see how many of the 991's high-tech driver aids, such as rear-wheel steering, find their way into the new model. But it is thought weight loss measures including a significantly stripped out and simplified cabin will be part of the package.

In the current market context of soaring Porsche values and with models such as the new GT3 RS and GT4 changing hands

Proof that a 911R, with manual gearbox, is on the way? It would appear so. Expect something even more stripped out than a GT3, less in the way of gizmos and electronics and smaller wheels and tyres



for significant premiums over list pricing, however, arguably the most critical unknowns may actually involve dealer allocations and pricing. Again, nothing is official, but suggestions of extremely low production numbers including UK allocations as low as 20 have been rumoured. If that's the case, then reports of pricing roughly in the same ballpark as the GT3 and GT3 RS models – or perhaps even higher – are probably academic. All will already be spoken for.

That would obviously be a pity, the mere existence of such a special model makes the Porsche ecosystem more interesting and is worth celebrating. Moreover, along with the recent Cayman GT4, Boxster Spyder and GT3 RS models, the new 911R surely bodes well regarding Porsche's future commitment to creating full-on sports cars for enthusiasts. Shame, though, that they have to be quite so rarefied and in such short supply. Time for a lightweight entry level model? We think so.

Top: Look closely and this prototype appears to be sporting some sort of rear diffuser, perhaps in place of a rear wing. Will be interesting to see how Porsche makes that work. **Right:** The original 911R packed a 210bhp punch from 2-litres and weighed well under 1000kg

'R' WAS FOR RACING

As exciting as the new 'R' undoubtedly is, it's not quite the same bare-bones purist proposition as the original 911R of 1967. That car took light-weight engineering to the absolute limit. Every possible component was lightened, including body panels fabricated in glassfibre. Factor in the stripped-out interior and the net result was just 830kg, over 200kg less than the already diminutive standard 911 of the day.

Engine-wise, a number of units were used in the 1967 911R, the most common offering 210hp. If that doesn't sound dramatic, the engine capacity was just 2.0-litres, which makes for a thoroughly exotic specific output, especially for 1967. With a kerb weight well under 1000kg, the power-to-weight ratio looks thoroughly modern, too. The 1967 R was, of course, a pure racer. But homologation problems meant it never

qualified for the sports car racing classes for which it was designed, forcing it to take on monsters

like the Ford GT40 in the prototype class. All told, just four prototypes and 19 customer cars were built. So

while the new 911R might be low-volume by modern standards, odds are it won't be nearly as rare nor quite as single minded as the spectacular original from the 1960s.



VW EMISSIONS SCANDAL INFECTS PORSCHE

V6 diesel Cayenne joins the list of emissions cheats

The Volkswagen emissions scandal, dubbed 'Dieselgate', rumbles on. Unfortunately, the latest news brings Porsche products directly into frame.

America's Environmental Protection Agency (EPA) says it has uncovered more evidence of VW cars running an illegal emissions defeat device. VW is now said to have used software designed to circumvent US emissions tests with its 3.0-litre V6 diesel engines on sale from 2013. The net result according to the EPA is NOX emissions nine times higher than the legal US limit.

The EPA says 10,000 vehicles are implicated including the VW Touareg, Porsche Cayenne and Audi A6, Audi A7, Audi A8, Audi A8L and Audi Q5. VW's response to the latest revelations suggest it believes this particular problem is a result of flawed certification as opposed to intentional cheating, but its current credibility on such matters isn't exactly impeccable.

As if that wasn't bad enough, as part of the VW Group's wider review of vehicle emissions in the wake of the scandal, it revealed that up to 800,000 petrol and diesel cars

have had their CO2 and fuel efficiency ratings wrongly certified. Perhaps not surprisingly, the figures overstate rather than underestimate the efficiency of the vehicles.

VW has set aside yet another large sum, in this case £1.4 billion, to cover anticipated losses connected with that particular emissions faux pas, though it's not thought to impact Porsche directly. To that you can add a new compensation scheme in the US involving pre-paid credit cards to help customers pay for fuel. As the saying goes, a



billion here, a billion there, pretty soon you're talking about real money.

For now, the direct impact on UK VW Group cars has been limited. However, with new revelations continuing to emerge, the final toll is impossible to gauge. The threat to the VW group as a whole remains existential.

That said, it's likely true to say that few if any of the major manufacturers would emerge with an entirely unblemished score card should their vehicles be picked apart in the same forensic detail as VW's cars are currently subject. What is currently a scandal restricted to VW could well infect the industry as a whole. Watch this space, in other words.

Porsche has been implicated in the VW diesel scandal. The V6 diesel unit, as used in the Cayenne and shared around the VAG range, is subject to the same software programming as already discovered in other VAG engines



PORSCHE SALES POWER AHEAD

While scandal engulfs the VW Group, Porsche continues to set sales records

With the bad smell of the emissions scandal still hanging over VW Group head office, here's a breath of fresh air from Porsche itself. 2015 is set to be a record breaking year in terms of sales.

From January to October this year, Porsche shipped 191,784 cars to customers worldwide, a 26.6 per cent increase on the figure at the same stage in 2014 and not far off the total number shipped for the whole of last year. 2015 therefore looks certain to be the year that Porsche shifts well over 200,000 cars for the first time.

Predictably, the Macan has been a sales sensation, racking up over 70,000 units already this year. But the evergreen 911 looks fit as a fiddle, too. Through October just over 27,000 new 911s have found homes, putting 2015 right up there with the most successful ever years for the iconic rear-engined model.

As an intriguing side note, China was Porsche's biggest single market in the month of October, registering 4950 cars to 4070 for second-placed USA. That said, taken as a whole, Europe stills rules with 6691 units. Whatever is happening at VW, therefore, there's no denying Porsche itself is fighting fit.



Sales are up for Porsche by over 26.6% in 2015 over the same period (Jan to Oct) in 2014, with 191,784 cars sold. The chances, then, of Porsche tipping over the magic 200,000 figure, should be just a formality

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OUR TAKE



REWRITING THE MANUAL?

Now that it looks like the new 911R is going to happen, it will form part three of a trilogy of manual-only sports cars from Porsche along with the GT4 and Boxster Spyder. So have we entered a new age of back-to-basics manual sports cars?

Not so fast. For starters, the new 991 GT3 RS remains PDK-only. So, the move to manual is hardly universal. If that seems confusing, on paper it makes sense. Porsche has finessed its product positioning to pitch the GT3 RS as the ultimate performance package while the likes of the GT4 and upcoming 911R major on driving involvement.

The tricky bit comes when you consider what Porsche customers actually prefer. The vast majority of buyers choose PDK. About 85% of 911s sold are now PDK and that's despite it being a cost option with a fairly stiff price premium. How many would choose manual if they could have PDK for free? Likewise, even if you bundle the GT4, Spyder and 911R together, you're probably looking at no more than one per cent of Porsche's ongoing annual production.

In that context, it's difficult to argue that demand for manual Porsches has suddenly spiked. However, Porsche clearly does recognise that a small band of enthusiasts still value the interaction of a fully manual transmission. What's more, it probably suits Porsche from a branding perspective to offer manual gearboxes on at least some of its models to maintain its credibility as maker of purist driver's cars. So while Porsche probably isn't turning back the clock on its transmissions strategy, manuals aren't about to disappear, either.



MACAN GETS GTS TREATMENT

Engine and chassis tweaks for smash-hit compact SUV

Porsche's newest model line, the Macan compact SUV, is already its biggest seller. But it just got even more appealing thanks to the addition of a GTS model to the range.

You can read our first drive impressions next month. But here's how the new Macan GTS stacks up on paper. Just like GTS versions of other Porsche models, this GTS is about subtle tweaks rather than major changes.

Based on the Macan S and its V6 twin-turbo engine, power is up by 20hp to 360hp with torque an even 500Nm. So that's 369lb ft in old money. As before, Porsche's seven-speed PDK transmission pumps the power to all four wheels with Porsche Traction Management (PTM) allowing for micro-managed torque distribution to each wheel. There's also a sports exhaust to amp up the aural element.

Next up, the Porsche Active Suspension Management (PASM) system has been massaged for tighter damper control and the ride height

drops by 15mm. The final chassis tweak involves 20-inch RS Spyder multispoke alloy wheels. The net result? The sprint to 62mph in 5.2 seconds or five dead with the optional Sport Chrono package, which also sharpens throttle response and adds even more pizazz to those dual-clutch PDK gearshifts.

Top speed is 160mph while the fuel efficiency is rated at 31.4mpg combined and the CO₂ emissions weigh in at 212 g/km. As for styling, the GTS is marked out by a special version of the Macan Sport Design body kit complete with moody black accents. Inside, Porsche has cooked up a set of special GTS sports seats with Alcantara centre panels, plus further lashings of Alcantara throughout.

The Macan GTS is on sale now starting at £55,188 and, if it's anything like other GTS models, odds are the overall package will add up to more than the sum total of the individual changes. Find out in our first drive next month.

Macan GTS in familiar GTS launch colour, plus subtle black detailing. Power is up by 20bhp to 360bhp



Ride height drops by 15mm on the GTS and the PASM system has been modified for tighter control. Sports exhaust adds to aural drama and interior (below) is swathed in Alcantara



TECH TWEAKS FOR 2016 MACAN

What's that you say? Upgrades? Yup, not just the new GTS but all 2016 model-year Macans are getting a full set of tech tweaks. First up is a revised Porsche Communication Management (PCM) system. Similar to the upgraded multimedia rig in the second-generation 991 coupé, highlights include real-time traffic data for the navigation system and a new high-resolution seven-inch touchscreen with support for gestures like pinches and swipes.

The new PCM platform also supports Apple's CarPlay interface for even better smartphone integration and support for the Siri voice control technology. Well, so long as you have an iPhone. The other major change is the addition of full-LED headlight technology with the optional Porsche Dynamic Light System Plus. Porsche says the light quality is the closest yet to natural daylight while headlight range is increased and power consumption reduced.

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A remarkable result. In just its second year back in topline sportscar racing, Porsche has managed to lift the WEC crown with the Hybrid 919.

The 911 RSR has come good too and currently leads the GTE-Pro class, with just one round to go



919 HYBRID TAKES WORLD ENDURANCE CHAMPIONSHIP TITLE

Dominant season for the 919 Hybrid and star driver Webber continues

It's official. Porsche's awesomely innovative petrol-electric 919 Hybrid, the hero of the Le Mans 24 hour race earlier this year, has been crowned overall king of prototype sports car racing. Courtesy of a fifth consecutive race victory, the 919 has secured the World Endurance Championship title. First place in the penultimate race in Shanghai, China for the number 17 car driven Timo Bernhard, Brendon Hartley and Mark Webber was enough to seal the deal.

Sister car number 18 helmed by Romain Dumas, Neel Jani and Marc Lieb finished second, ensuring the season's fourth one-two victory for the team. Porsche is now on 308 points, ahead of second place Audi with 238 points and Toyota on 137. The series win means Porsche has secured the title no fewer than 13 times since 1986.

It's been a remarkable run of form and a resounding proof of concept for the complex petrol-electric machine in just its second season of racing. The 919's combustion engine is a mere four-cylinder, 2.0-litre unit. However, thanks to a lithium-ion battery pack and both brake and exhaust heat energy recovery systems, the combustion and electric motors crank out nearly 1000hp of total system power and with unprecedented efficiency. The exhaust energy recovery system is unique in sports car racing and means the 919 generates electricity while accelerating. Neat trick, we think you'll agree.

Alexander Hitzinger, Technical Director of the race team, said, "We have won Le Mans in our second year and now the Constructors' World Championship, plus we have dominated every single qualifying – you cannot ask for more. I am really

proud of this team." Quite.

As for star driver, Aussie F1 refugee Mark Webber, he was equally effusive. "What this team has done in such a short period of time is just incredible. I have been involved in some pretty professional motor sports projects and I must say it is impressive to come to this level and have this result this year. It's really hard to produce these cars and get this top performance week after week. The Constructors' title is great for Porsche and everyone was working hard. Racing for these guys is amazing," Webber said.

The Shanghai race began under the Safety Car due to wet conditions, with pole-setter Brendon Hartley briefly losing the lead to 919 sister car number 18. The two Porsches swapped positions over the course of the six-hour race, but it was ultimately Webber's pace in drying conditions that brought number 17 home for the win. The Bernhard/Hartley/Webber combo in car 17 are leading the driver's championship on 155 but will have to wait for the final race to lock in overall victory.

Meanwhile, Porsche's 911 RSR driven by Richard Lietz and Michael Christensen took its third win of the season in the GTE-Pro class. The 470hp racer derived from the current 991 iteration of the 911 road car extended its lead in both the driver's and constructor's championships.

The eighth and final round of the Sports Car World Championship was in Bahrain on the 21st November.



Crowd funding appears to be all the rage. Will it work for a 917 recreation, aimed at encouraging young engineering talent? Well, if any race car could inspire donations, then the 917 is probably it

CROWDFUNDING A 917 RECREATION

Fancy a chance to crowdfund the recreation of a classic Porsche racer and give some young and talented engineers a leg up? Then Project 917 might be your bag.

The idea is simple enough. To build a recreation of the iconic 917, the Le Mans-winning race car and star of the Steve McQueen film of the same name. The car will be based on a chassis and body from Bailey Cars. This will be built to order and



delivered to Coventry where Advanced Manufacturing will provide a stunning facility to house the project. Crowdfunding to the tune of £50,000 is being sought via Indiegogo.

But there's a twist. Online competitions will be launched during the build process to locate young engineers who will then be invited to take part in the project.

"There is something very special about providing an opportunity to engage with young talent eager to learn and benefit from a unique project like this, especially as the UK is seeing fewer young people enter the field of engineering," says Ian Howe, who is heading up the project.

The whole project will be documented as part of a socially focused e-learning portal dedicated to help keen engineers learn, but also keep investors and other supporters informed and up to date. Find out more at project917.com.

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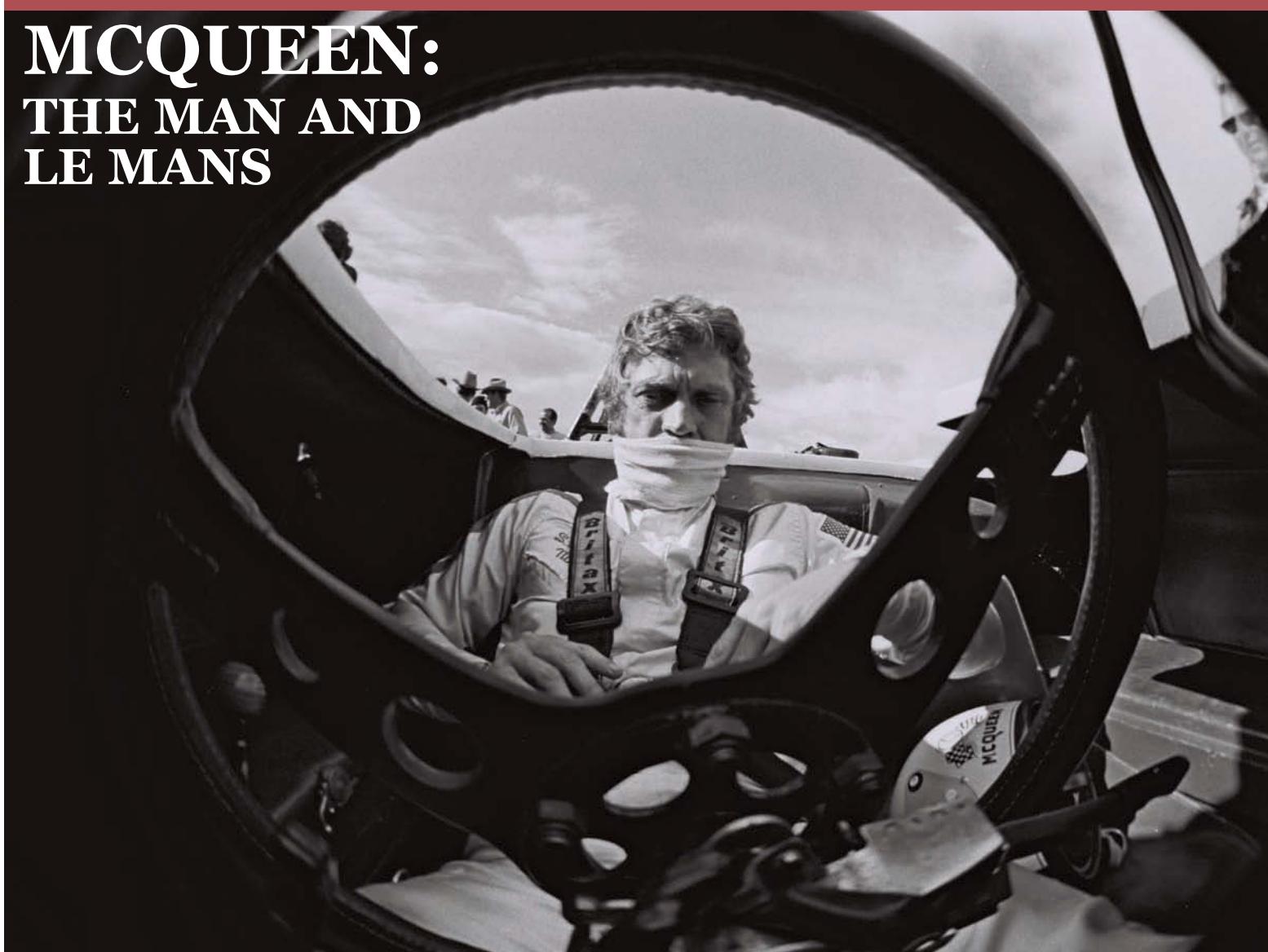
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MCQUEEN: THE MAN AND LE MANS



There's no ambiguity about the title of this film: McQueen: The man and Le Mans does exactly what it says on the film poster. It is a film of a film, or rather a film about one man's obsession with making a film about his other obsession – racing. Ah, racing. According to McQueen: "When you're racing it's life. Anything that happens before or after is just waiting." And he should know, he did plenty of it and successfully too, culminating in a second place finish at the Sebring 12-hours in 1970, with Peter Revson.

We've entered the world of the film reviewer. A pre-release screening in a subterranean cinema at New Soho House. A drink at the bar and then ushered to a very comfortable leather armchair for the main event. What is 911&PW doing here? Well, it's kind of obvious really, for as wrapped up and packaged with Le Mans as McQueen is, the same can be said of McQueen and Porsche and these, of course, are the three elements that make the film, from the moody shot of McQueen in the slate grey 911 in the opening sequence, to the on track action in the Gulf 917. Indeed the film made the 917 a star as much as McQueen and certainly contributes to its iconic status.

Of course, as we know, the film bombed on release and frankly was only ever made thanks to McQueen's name behind it. It was the ultimate vanity project, rambling and

largely devoid of plot. And it kind of disappeared for many years, rarely seen on television, but when released on video it became a cult-classic among mainly motor racing fans, who loved it for its realistic and lovingly filmed depiction of sports car racing from sports car racing's golden era. Porsche 917s battling it out with Ferrari 512s, plus Steve McQueen, what's not to like?

McQueen wanted to make a motor racing movie that was authentic, which is to say that he considered John Frankenheimer's 1966 film, *Grand Prix*, anything but. "We attempted to show in the film, rather than explain it, why a man races. And the feelings he gets from it. It's a great sense of freedom. It's a high of one sort or another."

He formed his production company – Solar – to make the film, easily got backing from Hollywood off the back of recent successes like *Bullitt* and the *Thomas Crown Affair*, and made camp at Le Mans before, during and after the race. Indeed he was still there filming in November 1970, when the remaining leaves on the trees had to be painted green for continuity.

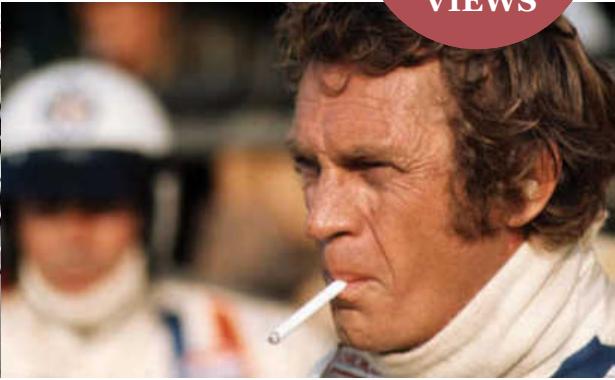
What Steve McQueen – The Man and Le Mans sets out to do, is tell the story of what was going on behind the scenes, the whys and wherefores of the whole project, which it largely achieves, despite some of the main protagonists being dead. Chief among those is, of course, McQueen, who died in

1980, cementing his icon status. The film is the idea of long time motor racing journo and commentator, Andrew Marriott, together with Brit documentary makers, John McKenna and Gabriel Clark. The trio also made the James Hunt/Barry Sheene film called *When Playboys Ruled the World*. Clark also wrote and directed an acclaimed documentary on legendary football manager, Brian Clough. In other words, they have pedigree. Also instrumental to the film's success was Archive producer, Richard Wiseman, who worked on the last great racing film, Ron Howard's *James Hunt/Niki Lauda face-off, Rush*. After months of Hollywood sleuthing it was Wiseman who managed to discover all the

Above: McQueen the racer. He finished second overall, with Peter Revson, at Sebring in 1970 in a Porsche 908. Below: At Le Mans filming with the drivers



From left to right:
McQueen in blue peaked helmet and flame proff balaclava – an image synonymous with the film. With his first wife Neile at Le Mans. Enjoying a gasper



unused footage from Le Mans, which makes up the back bone of the documentary.

Crucial was the cooperation of McQueen's son, Chad, and McQueen's first wife and Chad's mother, Neile Adams McQueen. Many of the drivers involved in the film are still with us and Derek Bell and David Piper feature heavily. Both have a human story to tell. In McQueen's pursuit of authenticity, the filming was done at racing speeds, with no fakery. Bell suffered facial burns in a fiery crash, while Piper lost his lower leg in another. Neither received any sort of compensation and considered the danger part of the £200 per day fee, which was a lot of money in those days. In letters uncovered later, McQueen requested to those in higher places within the company that the film's opening night profits might be donated to Piper. The request fell on deaf ears.

The above reveals that McQueen and his production company, Solar, lost control of the film as it spiralled out of control, to Cinema Center Films, the company that was supplying the money, all \$6 million of it! Without a script, the film largely seemed to be in McQueen's head, which was largely

elsewhere. He had dodged being a likely victim in the notorious Charles Manson killings (thanks to a rendez-vous with a mystery blonde, which meant McQueen didn't attend the murderous party. His name was at the top of Manson's discovered list, though). His wife had confessed to a tit-for-tat affair in retaliation to McQueen's own blatant womanising, and he had fallen out massively with friend and producer, John Sturgess, who famously remarked "I'm too old and too rich to put up with this shit." Sturgess, who had worked with McQueen on Bullitt and the The Great Escape, wanted a more commercial Hollywood story, McQueen wanted nothing less than a pure racing movie. Cinema Center Films parachuted their own man, Bob Rosen, in to rescue the film and to whom McQueen reluctantly handed control to.

It's fair to say that McQueen never really recovered from the Le Mans debacle. Yes, he went on to make other films, but rather sporadically. He retired from racing too, which perhaps gives more of an insight to his state of mind. Racing was, after all, a form of escapism for McQueen.

The legacy, then, is the film to which this film exists. Was there a great story there to

be told? Hmm, that's debatable. There was certainly an interesting story to be told, helped along by Chad McQueen – who makes a return to Le Mans for the first time since a child in 1970, and with a slate grey 911 to add to the effect – and first wife Neile, plus contributions from Bob Rosen and scripwriter, Alan Trustman, whose career never recovered from his involvement in Le Mans, after quitting the film.

McQueen was certainly having some sort of meltdown, and he clearly couldn't get his head around what he wanted the film to be, other than an homage to racing, which actually is fine, just not commercially viable, as the box office records. What the film reinforces, though, is sheer gladiatorial nature of sports car racing back in the early '70s. The speed, the romance, the sheer noise and heroic drivers blasting down the Mulsanne Straight at 240mph in flimsy glassfibre and tubular steel contraptions with 12-cylinder engines strapped to their backs and fuel tanks either side. Perhaps McQueen had it right all along?

Steve McQueen was released in the UK on 20 Nov in selected cinemas. Look out for the forthcoming DVD release.

Chad McQueen at Le Mans in 2014, the first time he had returned since 1970 when he was just eight years old





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The tempting trinkets that enhance Porsche ownership

COOL RUNNING

This winter, cold weather needn't cramp your style. Not if you snag a set of these new wheels from Gemballa. Thanks to multi-layer sealing and cast or forged construction, Gemballa reckons the GForged-one, GT SPORT Forged and GT SPORT-R are perfect for winter running without compromise. Available in sizes from 20 to 22 inches, they're specified to fit 911, Macan, Cayenne and Panamera models. The five-spoke design doesn't just look slick and result in light weight. We'd wager it's easier to keep clean during the particularly mucky winter months, too. Gemballa says that despite the wheels' typically "summery" proportions, they're designed to be compatible with winter tyres from the likes of Michelin and Vredestein for unstoppable all-weather performance. Prices start at £3380 and you can learn more at gemballa.com.



GT-ROAR

Can you improve on perfection? With the new Cayman GT4 racking up awards faster than you can say slick-shifting manual, it's an interesting question. Of course, factory exhausts do have to operate within strict legal limits. So, it's not a huge surprise to find Fabspeed has already cooked up not one but two sets of headers for the cracker-jack new Croc. You've a choice of Race headers with the cats removed or a Sport option with high-flow HJS converters. The Race headers are designed for track and off-road use and are claimed to net an extra 27hp and save 5kg in a critical area of the car. The road-legal Sport headers slice off 3kg and are said to be good for 26hp, which would take the GT4 well over the magical 400hp mark. Pricing is \$2495 and \$3095 respectively and thus around £1600 and £2000 plus taxes and shipping.

More at fabspeed.com.



OHLINS GOES OLD SCHOOL

Great news for 964 owners. Ohlins has developed a version of its hot new Road&Track coilover kit for 964 C2 and C4 models. The big attraction is Ohlins' DFV or Dual Flow Valve technology, which allows for consistent damper fluid flow in both rebound and compression. It's what gives Ohlins dampers their characteristically compliant-but-controlled feel. That aside, highlights include predominantly aluminium construction for light weight and corrosion resistance. The kit is fully height adjustable and runs 50N/mm front and 90N/mm rear springs. Available both with and without Ohlins' own aluminium top mounts, the Road&Track kit is an intriguing alternative to the big established brands in this part of the market, Bilstein and KW. Prices start at £2587 from design911.co.uk. You can find out more at roadandtrackbyohlins.com





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MOD-FREE MOUNTS

While we're talking track tweaks, here's another for serious track day addicts and racers. Brey-Krause has a new fire-extinguisher mount designed specifically for the latest 991-series 911 models and 981-series Boxsters and Caymans, the R-2050. Brey-Krause specialises in making high performance and competition-spec parts that use existing factory mounting points and holes and can be fitted without modifications or invasive and irreversible procedures. The R-2050 fire extinguisher mount is no different. It mounts either a Brey-Krause R-9520/R-9530 Quick Release extinguisher or a stock Amerex fire extinguisher bracket to passenger-side 991 and 981 factory seats. The R-2050 retails at \$105 Stateside. That translates into roughly £68 in old money. To that UK customers will need to add VAT, shipping and import duties. For more, nip over to bkauto.com.

BRAIDS FOR YOUR BRAKES

Empirical testing proves standard rubber brake hoses deform under high pressures and temps. The extent to which you can feel the benefit may be more subjective. But if you do need new hoses, braided has to be your best bet. Enter Forge Motorsport's Hosetechnik division. The clue is the name, but Forge Motorport says it can knock up braided hoses for any classic or sports car. By way of proof they've done a Blue Peter and presented some 944 items they made earlier. Available in 12 hard-wearing 95PVC colours, the hoses have frictionless braided stainless steel bodies and custom-machined stainless end fittings. The result is said to be improved pedal feel and sufficient durability for a life-time guarantee. Nice. The full set is yours for just £79.20 and you can find out more at hosetechnik.com or on 0845 838 5364.



TOMTOM ONE 6100 £299.99

With sat navs now ubiquitous, their makers are having to become more inventive to encourage repeat purchase. TomTom – one of the biggest names in the business – has recently upgraded its range to include in-built world maps, and lifetime traffic information and speed camera updates.

On 911&PW's recent foray to California, we put TomTom's large unit, the One 6100, to the test. Large means a 6in touchscreen which is a model of graphic clarity even if it takes a while to get accustomed to its bulk. Most of the screen is occupied by 2D or 3D mapping, while a chunk on the right-hand side is given over to upcoming route information, such as how far away the next fuel station or traffic jam is, along with how much further you have to go.

The world mapping was as effective as we'd hoped it would be in the sprawling road network of Los Angeles – the guiding voice, however, had some trouble with pronunciation, most entertainingly calling every boulevard a 'boul-y-ev-ardy'. Still, we always got to where we wanted to be, and we like the fact that we could probably make the same boast if we were in Austria or Australia.

Back on British roads the traffic information system let us know how long a jam we were going to be stuck in, but possibly because either the jams weren't long enough or there wasn't a suitable diversion, we were never offered an alternative route. Yet it's comforting to know that TomTom has this facility and we look forward to trying it out one day. Entering a destination isn't as simple as it was with older TomToms, and it's a shame there's no longer any Bluetooth to connect to your mobile, but the lifetime updates and general ease of use make the One 6100 a very desirable travelling companion.



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Attention all ye air-cooled cork sniffers. Your wine cooler of choice has arrived. It's the Porsche Classic Cooler and it's made from a little bit of an air-cooled car. Yes, literally. The top half of the cooler is hewn from an original finned cylinder case pinched off a G-series 911 motor. That, in turn, is attached to an aluminium base complete with a laser-etched Porsche logo, don't you know. OK, £450 is getting on a bit for a receptacle in which to plonk some, er, plonk. But storing your favourite bottle in a bona fide bit of an old Porsche is guaranteed to keep things cool in more ways than one. It's just one part of a classic-themed collection that includes everything from self-winding watches to caps and key chains. You can get the lot from shop.porsche.com/uk.



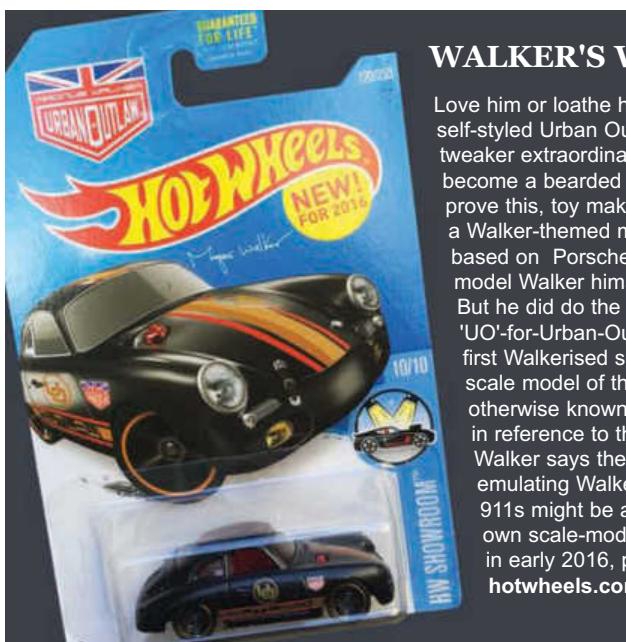
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For the ultimate in flat-out forays into the world of Porsche driving, however, it has to be the Porsche GT driving experience. It ain't cheap at £750. But it's a full-day experience that starts with 30 minutes in the latest 911 Carrera. Next up is fully two hours in one of Porsche's modern-classic road-legal racers, the 997 GT3 RS, the mighty 997 4.0 litre RS or the latest 911 GT3 RS. All the while you're getting expert tuition from a dedicated Porsche Driving Consultant, not to mention a few feeds in the Porsche restaurant. All the Porsche driving experiences can be ordered from 1pec.porsche.com.



WALKER'S WHEELS

Love him or loathe him, there's no denying that self-styled Urban Outlaw and air-cooled 911 tweaker extraordinaire Magnus Walker has become a bearded brand in his own right. As if to prove this, toy maker Hot Wheels has rolled out a Walker-themed model in his honour. Oddly, it's based on Porsche 356 coupé, which isn't a model Walker himself has owned or modded. But he did do the graphic design, including the 'UO'-for-Urban-Outlaw logo. It's not actually the first Walkerised scale model. Schuco did a 1:43 scale model of the most famous Walker 911, otherwise known as "277", last year. However, in reference to the new Hot Wheels model, Walker says there's more to come. So while emulating Walker's impressive collection of 911s might be a tall order, you can build your own scale-model fleet starting here. Available in early 2016, pricing remains TBC. hotwheels.com



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1:43



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1:18



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THE USUAL SUSPECTS

Editor Bennett goes to an auction and manages to sit on his hands, but then, as he argues, why buy from an auction at dealer prices, but with none of the associated dealer warranties? Elsewhere he's looking forward to the new Gen 2 991 and it's congratulations to Porsche on winning the 2015 World Endurance Championship

HE WHO DARES...

The auction scene has been gaining some serious traction in recent years, thanks mainly to the classic car boom. There's rarely a month that goes by when we're not reporting some new record price for a '73 RS or the like. In America classic car auctions are almost like a form of show business with the auctioneer hyping up the bidding, plus flashing lights, whooping and cheering from the crowd, big screens and banks of people manning the phones for those international buyers. In that environment, it's no wonder some folk get a bit carried away.

As usual we're a few years behind, but buying at auction has become very popular here, too, albeit minus the showbiz element. That said, auctions have become big business, particularly when aligned to events like Goodwood Festival of Speed and the Silverstone Classic, and there may not be the razzmatazz of the US auctions, but there is a great weight of expectation and seemingly no shortage of buyers prepared to meet that expectation. It almost seems that there is a new form of buying, with associated bragging rights if you happen to buy something at a world record price. Seems a bit obscene to me, but then what do I know?

It used to be that an auction was the place that you went in the hope of getting yourself a bit of a bargain – 'hope' being the operative word there. Now it seems you're guaranteed to pay top wack, and for what? OK, so it's pretty straightforward for cars that have a cast iron provenance. They are usually pretty well known in the first place, or are so super-rare, that an auction is the only place to sell given the potential huge demand. Low mileage stuff is typical auction fodder, too, and a pretty safe bet given...well, given that a car that's only covered a few thousand miles can't be hiding anything too untoward.

But what about all the stuff in the middle? In the days when buying from auction came with prices that made it worth taking a punt, it was perhaps worth the risk. He who dares and all that. But nowadays, when auctions are generating similar prices to specialist dealers, where is the incentive? Bear in mind that buying from an auction comes with no guarantees, no comebacks and absolutely no warranties. Would you really spend, say, £35,000 on a 911 Carrera 3.2 at an auction with none of the above, when you could have that peace of mind from a dealer?

I've been to a couple of auctions recently, and very interesting they were, too. The big news auction was the Porsche Sale held by

Silverstone Auctions in partnership with Porsche Club GB. Sixty-odd cars, with a few headliners, headed up by the inevitable '73 Carrera RS. There were a number of water-cooled RS's, a couple of flat-nose Turbos, some quirky super-low mileage stuff like a Boxster 550 Anniversary with 2800-miles on the clock and a 944 S2 Cabrio with 18,000-miles on it. Other notables were a Viper Green 911 RSR style hot-rod built by Porsche GB to celebrate 50 years of the 911 and a 930 Turbo fully restored by Porsche Centre Leeds as part of Porsche GB's dealer resto initiative/competition. There was even a 924S and a lonely-looking 996 C2 with a mere 45,000-miles on it.

There was no shortage of punters and plenty of screens showing the prices in all currencies, including dollars, euros and yen, and there was a bank of telephone operatives and computerists handling the telephone and online bids. Most people were like me and just rubber necking. There was a palpable air of expectation as the bidding got under way. It was obvious that the pool of buyers was quite small, and the pace was a tad slow, with many cars failing to meet estimates, although once the 12.5% buyers' premium was added on, that was kind of addressed.

The quirky stuff generated the most interest, with the aforementioned Boxster selling over estimate at £23,850 and the 944 Cab for a frankly astonishing £27,560. The 924S made an equally strong £6000 or so and even the 996 C2 went for above estimate (think I'll put my 944 into an auction on that basis). The Porsche built hot-rod made a very healthy £173,250 and the 930 Turbo an equally strong £118,125, while the various GT3s struggled. In the middle a whole bunch

of air-cooled stuff was either up or down, with no apparent rhyme or reason. The '73 RS? Oh, a relatively strong £410,625.

So, the quirky stuff I get. The Boxster was a relative bargain, when you consider that it was virtually brand new, but at a price that wouldn't frighten you off using it. The 924 was cheap as chips in the great scheme of things, although strong money for what it was. The various GT3s were all exceptional cars with low mileages and unlikely to hide anything. They were also well under what some dealers have been trying to sell GT3 and RS models in particular. A 997 GT3 went unsold at £59,000, while the 944 was just insane.

However, I come back to the air-cooled stuff in the middle and the various 964s, 993s, SCs, Carrera 3.2s etc. Some were very nice, no doubt, but others were very ordinary indeed, but they mostly made strong, dealer type money. A left-hooker 964 at £29,250 and some £7000 over its highest estimate.

Seriously? I know 964s are making good money, but there was nothing special with this one, and it was a C4. An honest looking SC went for £20,000, but really it could have been hiding anything. A few unexceptional 993s – all Targas and Cabrios – were at close to dealer prices and I know for a fact that one of them was entered into the auction by a dealer who had taken it in part ex, but it required too much work to make it worth his while turning round. Perfectly legitimate and a good return too, but only one person won there. I doubt that was the only dealer entered car, either.

So strong money paid and, without wishing to sound like a stuck record, no warranties. Just pay the hammer price (plus 12.5% buyers' premium, plus VAT on that premium) and take it away. That's really very brave.



STEVE BENNETT

Editor,

911 & Porsche World

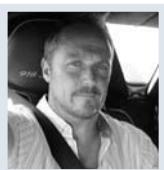


The auction scene is big business, but it still pays to tread carefully. Silverstone Auctions' all-Porsche sale drew a healthy crowd and some of the newer cars made good sense and money. It's with the older stuff that buyers should tread carefully, particularly as there are no warranties or comebacks in this game

Say what you like about them, but 911 & Porsche World's elite squad of journalists and Porscophiles have opinions aplenty on all manner of automotive matters. And this is where they get their two-pages' worth



KEITH SEUME



BRETT FRASER



ADAM TOWLER



PAUL DAVIES



CHRIS HORTON



JOHNNY TIPLER

TALK THE TORQUE

Elsewhere in this issue, we've driven the new 991 Gen 2, complete with brave new world turbo engines. As I write this, the launch hasn't actually happened (such is the archaic way that we put magazines together), so I can't categorically tell you what they're like. That job falls to Adam Towler and you can read what he thinks on p42 of this issue.

Actually, despite at this stage having to adopt a vicarious view on the potential of the new machines, I'm really quite excited. I find the current 991 generation of 911 to be rather clinical and aloof and, frankly, just too capable for its own good. It's a car that only shakes its prodigious stuff close to its limits. Fair enough, but that becomes something of a problem when the limits are so high. This is exacerbated by the current normally aspirated engines, which rely on revs to generate their peak power and that problem is further exacerbated by the tall gearing that 911s now have to help with economy and emissions. This makes the engines feel rather lifeless, particularly in 350bhp C2/C4 guise, which has to be worked very hard indeed to get any wiggle out of the chassis. With shorter gearing this wouldn't be a problem. The aspirated engines have sufficient capacity to generate a reasonable amount of torque, but they are made to push the sort of gear that Chris Hoy would struggle with.

In a similar way I've never really got, or liked, powerful small capacity engines, like Hondas VTEC spinners, that rely on revs to make their power. On paper 200bhp or so from 2-litres looks great, but then look at the torque curve? It will be minuscule and starts at 5000+rpm. That's fine on track, where you can be in the sweet spot all the time, but on the road, just in order to get to that sweet spot you first have to wind the thing up to its upper rev limits. And those sorts of engines never even feel particularly powerful either, because there is no spread of power.

Say what you like about the new Hybrid F1 engines, but half the reason that the current F1 cars move around more is because they now have some torque to deal with. The previous 2.4-litre V8s may have made 800bhp, but within the narrowest of power bands. The drivers all hated them because they were so weedy.

So back to the new 911, with its turbo engines. I know I'm going to like it, because

it's going to have some serious mid-range muscle to overcome the tall gearing that it will still be forced to run. Mid-range muscle equals more fun and more energy to put through the tyres and the chassis, which in turn means you won't have to drive it quite so frantically to get the best out of it. It may not be the purist view, but for the road, and combined with eco-minded gearing, it makes a lot more sense.



Bennett hopes that the new turbo engines in the Gen 2 991 will add vital flexibility and make for a more rounded road car, rather than the rev hungry, normally aspirated Gen 1 991s, which were at odds with the 991's eco tall gearing

CONGRATULATIONS

Are we surprised? Well, yes, a little bit I guess. I'm talking about Porsche's fairly crushing domination of the 2015 World Endurance Championship. Surprised in the main because they came into a series that not only had they been out of for well over 20 years, but one with fiendishly complex rules that can be interpreted in seemingly endless permutations.

The surprise, then, is that they got it right so quickly, with 2014 acting as a sighting year, before annihilating the opposition in 2015. Since Le Mans they have won every round, wrapping up the championship a race early in Shanghai and, to add to the fairy tale, it's the Mark Webber led trio of Timo Bernhard and Brendon Hartley that

has got the job done. For Webber, that move from F1 must seem very worthwhile, particularly in view of former team Red Bull's torrid 2014/15.

Indeed F1 is a fair comparison, given the mess that some manufacturers have made of the new hybrid rules, but then perhaps Porsche benefited from the myriad of options that the WEC LMP1 class permits, arriving as they did with a turbo/hybrid V4 configuration. Whatever, it certainly worked and the opposition were no pushover. Both Audi and Toyota must be somewhat surprised at just how quickly Porsche gets its head round the task.

More than anything, though, it feels like Porsche is back where it belongs.



Well, that didn't take long. After returning to contemporary sportscar racing in 2014, with reasonable success, Porsche has stuck it to the competition in 2015 winning Le Mans and the World Endurance Championship

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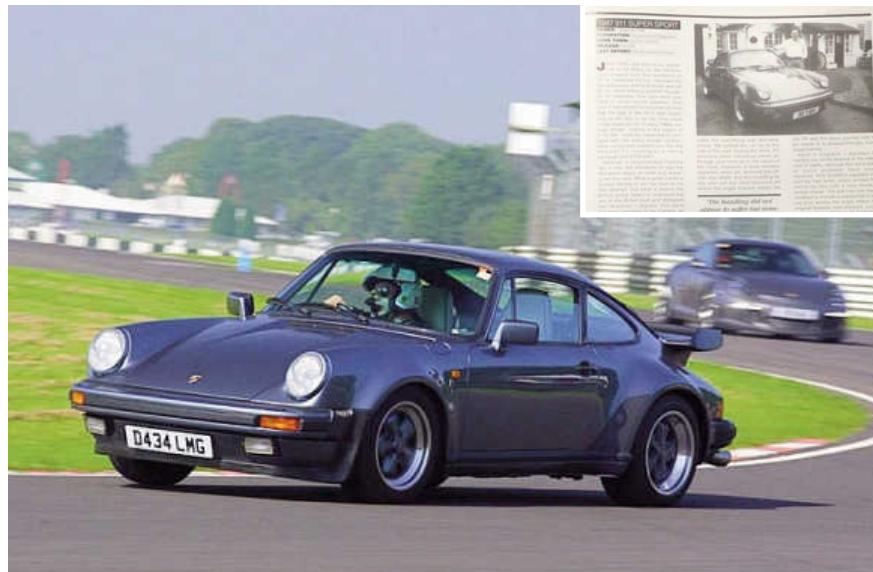
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YOU WRITE, WE READ

LETTERS

Got something to say? Need to express an opinion on the Porsche world? Well, here's your chance...



STILL RUNNING

I have been an avid reader of 911 & Porsche World since 2007 when I decided to spend my deposit money for a flat on a used 996 – a great investment as it turned out, giving 8000 miles of happy motoring and I broke even on the resale. Good times!

More topically, last year I bought a car that should be well known to the longer served of the 911&PW crew, Graeme Cole's 3.2 SSE, a car that featured in *Running Reports* over many years in the late 1990s – see page 71 of issue 46, for example. It's featured under *Time Machine* (I also have other copies from 1993, '96, '97 and '02 which feature the car, but believe there are more issues which I am missing).

I had the idea that it might be a nice opportunity to do a 'Running Report Update + 15 years' on how the car has fared?

I bought the car after the last owner passed away and have since been restoring it back to its former glory. The mechanicals

were sorted by Northway, with complete disassembly, restoration and a glass-out respray done by a race car shop in Essex. The next job – finances permitting – is an interior overhaul.

Despite being cosseted, after collecting the car from reassembly in September, I took her straight to the Porsche Club GB day at Castle Combe where I managed to sneak the car on track for three laps.

People share various opinions on the SSE – I am used to racing big horsepower early Corvettes and while I don't feel any of these cars are particularly fast, it's the balance that really impresses me.

Adam Chodosh, via E-mail

Keith Seume replies: *Hi Adam, the car looks fantastic! And we're glad it's in the hands of someone who is not only taking good care of it, but also driving it like it was intended. By all means keep us up to date with your news – it's always good to hear about our former feature cars.*

GET OUT AND GET UNDER

Firstly, thank you for publishing my letter about the Targa in the Highlands (*Letters*, December 2015). It's interesting to note the people who have seen it in various parts of the world.

I just spent some of my Saturday and Sunday morning reading the magazine and, as Steve Bennett says in his editorial, the issue has come together into a real beauty of a driving theme.

I really enjoyed your Scottish drive and the way you got into what read like a seriously good flow. My son in Hong Kong and I have already discussed that drive as one we should consider in the future.

With driving in mind, you may find this website of interest: www.nzfmr.co.nz. It's basically a New Zealand Porschefest over two weekends at Hampton Downs race track, which is about 45 minutes south of

central Auckland. It won't quite be Laguna Seca but we expect 300-plus Porsches. The Formula 5000 cars which attend are also always special.

Even if he says no this time, I think you and Mr Fraser should pester the boss into buying you a couple of return tickets to NZ during our summer period, October through to April. There are a lot of interesting Porsches down here. I'm sure with a bit of arm twisting between Porsche GB and Porsche NZ, a car could be organised for you.

There are some nice driving roads down here and I'm sure a lot of your NZ readers would be very happy to share some of their hospitality. So keep it in mind and I for one would be happy to do some organising on your behalf.

Keep up the great work – your mag is such a good read.

Bill Abercromby, New Zealand

Adam Chodosh is now the proud owner of one of our former Running Report feature cars (see inset when it belonged to Graeme Cole). Always good to see a car used as Porsche intended...



New Zealand Porsche Festival is worth a visit, says Bill Abercromby. Now, where's that passport?



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LATE STARTER

Stuart Mackay's 996 Carrera 4 may be his first Porsche, but it's destined to be joined by a 996 GT3 just as soon as finds the right one. Not that the C4 will be ousted. It will just be complemented

Words and pictures: Brett Fraser

When it comes to Porsches, chartered engineer Stuart Mackay was a late starter. He didn't buy his first, the silver 996 Carrera 4 you see here, until three years ago, but he has embraced Porsche ownership wholeheartedly since then, joining the Porsche Club GB and attending many events where the Porsche faithful congregate. And he's got plans, now quite advanced, for another Porsche, probably a 996 GT3, to expand his fleet.

Whilst a relative newcomer to the qualities of the Stuttgart brand, Stuart's appreciation and passion for engineering began at a very early age. 'I guess it all started when I was about four and I made my first Airfix kit – it taught me to think in three dimensions, which started a lifetime of tinkering with model aircraft and tuning cars. But later on, I attended a grammar school, here, I was taught stuff like Latin and other purely academic subjects, and the whole notion of

engineering completely vanished. It wasn't until I left there, aged 16, that I discovered the whole new world that becoming an engineer presented.'

After escaping school Stuart earned an engineering apprenticeship at Norwich engineering firm Laurence, Scott & Electromotors, working on power generating and military equipment. 'Actually I wanted to be a pilot,' he confesses, 'as my father had been one in the RAF. Unfortunately my eyesight at the time wasn't that great.'

If you're into engineering and aviation it's inevitable that cars will also feature strongly in your life, too, and so it proved for Stuart. 'I remember being at Snetterton in the mid-'60s and being in awe of the Aston's thundering up the old Norwich Straight. And then there were the 8.1-litre Can Am racers that made the air shake and sent vibrations through your whole body. My love of cars was certainly nurtured by watching these beasts.'

Thus inspired, Stuart eventually cajoled his father into buying a MkII Ford Escort

RS2000, the first black droop snoot model in the UK, before taking his own plunge into car ownership. 'My first car was a Mk1 Lotus Cortina that I bought for £175, because back then nobody really wanted them. I learnt a lot from that car. It was rather tatty so I dug a pit in the back garden and took the car completely to pieces. By the time I'd finished replacing panels, only the floor and the roof were original. 'My work must have stood the test of time as the car is still racing in Historic saloons, having been driven by legends such as Gerry Marshall and Jackie Oliver at Goodwood and other iconic tracks in Europe after it passed on to others to enjoy!'

'I stripped and rebuilt the Lotus twin-cam engine and got plenty of practice replacing the notoriously unreliable water pump. And it wasn't long before I got into engine tuning, which to me was an engineering exercise – I was able to reliably squeeze out 180bhp from the twin-cam in the late 1970s.'

Stuart was always a big fan of the Lotus engineering philosophy of adding lightness –

Stuart Mackay and his 996 Carrera 4, bought with just 19,000-miles on the clock and cherished ever since



the company's Hethel HQ was just down the road – and he went on to buy an S3 Elan that he converted to look like the 26R factory racer. 'I had a season racing the Elan in 1982 with the Historic Sports Car Club and it was tremendously good fun.'

By now a compulsive car buyer, Stuart added a second Elan to his fleet, as well as a 1965 Mini Cooper S that he re-shelled, and a 1971 Ford Escort Twin Cam. 'That Escort was an absolute minter,' he recalls. 'It was a two-owner car, had only done 40,000 miles and still had its plastic seats and original floor mats. When I sold it in 1985 I got £3500, which back then was very strong money.'

Not that Stuart was selling the Escort as part of an investment strategy – in fact, he was disposing of his entire collection. For several years he'd been working as a manufacturing director for the German agricultural machinery maker, Claas, and was about to embark on several foreign postings, including Germany, China and India; he couldn't take the cars with him. And when he eventually returned to Blighty, career, kids and company cars held his sports car obsession at bay.

'That side of my motoring life was rekindled in the late 1990s,' Stuart explains, 'when I spotted a Westfield languishing outside a house in a nearby village. It was an exciting car but it didn't take long before the modifying bug caught hold again.' Cue a strip down, rebuild, engine transplant, and transformation into a road legal yet track-biased monster.

Suitably inspired by the Westfield, Stuart decided he wanted a more thrilling everyday cruiser than the Volvo he'd acquired when he'd left Claas. 'Back in early 2013, a friend casually pointed out what good value Porsche 996s had become. A quick look on Auto Trader and I found a 1999 Carrera 4 Tiptronic with just 19,000 miles on the clock: I paid about £5000 over the odds because of that low mileage. The car had been bought by a gentleman for his 50th birthday: he mainly lived abroad but kept the 996 in a garage in Chelsea as his London car, but evidently didn't get around to using it very much. But he looked after it meticulously.'

'Even so, I was bricking it because of all the internet scares over engine reliability and longevity and in particular the IMS issue. I joined the Porsche Club (GB) to gain access to the forums and found that Richard Hamilton, technical guru of the 996 Register, was extremely helpful. At his suggestion, I bought an IMS Guardian from Wrightune – essentially it's a magnetic sensor that takes the place of the sump plug and detects small fragments of metal in the oil. It doesn't prevent IMS failure but does give you early warning before things get really expensive.'

'As it turns out, my fears were totally unfounded with my car proving extremely reliable and in three years of ownership I've almost doubled its mileage without a problem. I treated the car to its first major service at Max Rowley's Porsche Service Centre in King's Lynn, which cost me £823, and added cruise control, programmed by Autowerk in Norwich. I've also had to replace the original 15-year-old battery, and splashed out £13.28 to replace a faulty temperature sensor and replace the handbrake pads. When I took the car into Porsche Centre Cambridge for a Porsche



“ with 19,000 on it I paid about £5000 over the odds because of that low mileage ”



Top: Our own Johnny Tipler would doff his cap to the mods that Stuart has applied to his 996, with its rear wing, GT3 sideskirts and front apron, plus lattice split rims, that are identical to JT's choice of wheels. Interior is standard and Stuart is very happy with the Tiptronic transmission

HISTORY

The 996 was Porsche's first all new 911 since the model's launch in 1963. It was the car Porsche simply had to build, having backed itself into a corner with the air-cooled 911s, which were both expensive to build and fell foul of noise and future emissions legislation.

Launched in 1997, the 996 model 911 featured a water-cooled flat-six and a new modern take on the 911 shape. It shared many components with the Boxster and was built in an entirely modern way. While slightly sanitised compared to the last of the air-cooled 993s, it was both lighter and a good deal quicker, with stunning cross-country pace. Right now, the 996 is the best value 911 out there.



996 Register-organised Service Clinic & Health Check, the only negative on the report was a bit of corrosion on one of the exhaust clamps nuts...

'A teaching colleague of mine [amongst other things Stuart lectures in motorsport engineering courses at Norwich City College] Dave Lee reprogrammed the engine and gearbox ECU for me – for about £250 I now have 38bhp more than standard and an extra 53lb ft [39Nm] of torque. And the fuel consumption has improved considerably, so that I'm now getting in excess of 30mpg on a run.'

You may have noticed that Stuart's C4 doesn't look standard. 'When I was buying the car, what I was really hankering after was a GT3, but felt that was a lot more than just a toe-in-the-water commitment,' he confesses. 'So I bought an original GT3 front PU spoiler unit very cheaply off one of the 911 forums and then cut some GT3 RS-style inlets with mesh covers. The side skirts cost £100, again from trawling the forums, and the tail spoiler – which I think is a Strosek item – was £200. Shaun McVeigh from Diss Accident Repair Centre (01379 651451) in Palgrave, painted them for me in Arctic Silver; I added the air intake grilles and fitted them with all-new Porsche hardware, guided by a Porsche Aerokit Technical Bulletin supplied by the encyclopaedic Richard Hamilton. The

split-rim BBS alloys were an eBay purchase: they were a bit bashed and scratched so I had them refurbished and powder-coated by Aerocoat in St. Olaves, who did a brilliant job.'

Although comparatively late to the Porsche party, Stuart has been making up for it during his three years of ownership. 'My partner and I went on a 3000-mile European tour in 2015, taking in Reims, Spa, the Porsche Museum in Stuttgart, the

automatic is so good that I rarely use the paddles – I've played with them on a hillclimb course in the Black Forest and on a trackday at Snetterton, but really that's it.'

Conscious of the fact that his C4's role is really one of a grand tourer, Stuart is now on the hunt for a 996 GT3 – or possibly a 997 GT3 – to satiate his appetite for Porsche-flavoured track miles. He's already been to see a few and had an educational chat with the friendly chaps at JZM and RPM Technik.

“ Regardless of the naysayers, I love the Tiptronic ”

Black Forest, Lake Constance and Garmisch-Partenkirchen, and joining in the fun at the 2015 Oldtimer Grand Prix at the Nürburgring. We also took part in the 50th anniversary celebrations for the 911 at Silverstone in 2013 when 911 cars took to the track. And in 2014 we won Best German Sports Car on a PistonHeads East Anglia Fish & Chips Run – we won a jar of sauerkraut!

'The 996 is very quick yet so easy to drive, and regardless of the naysayers, I love the Tiptronic. The programming of the

'I've got another 997 GT3 to see in a couple of days – it's Speed Yellow which is the colour I'm really after.'

Stuart's C4, however, isn't under threat from a new arrival. 'It's a privilege to own my 996 and look after it until a new guardian takes my place in the future. I still get goosebumps when I open the garage door and see it standing there – it's an emotional thing that some people will 'get' and others will think slightly strange. And that's why I'm in no rush to find the right GT3: I need it to give me those goosebumps.' PW

Immaculate engine bay reflects an immaculate car. Stuart has doubled the mileage in the two years that he's had the 996, taking it to 40,000-miles or so. An IMS Guardian from Wrightune gives peace of mind



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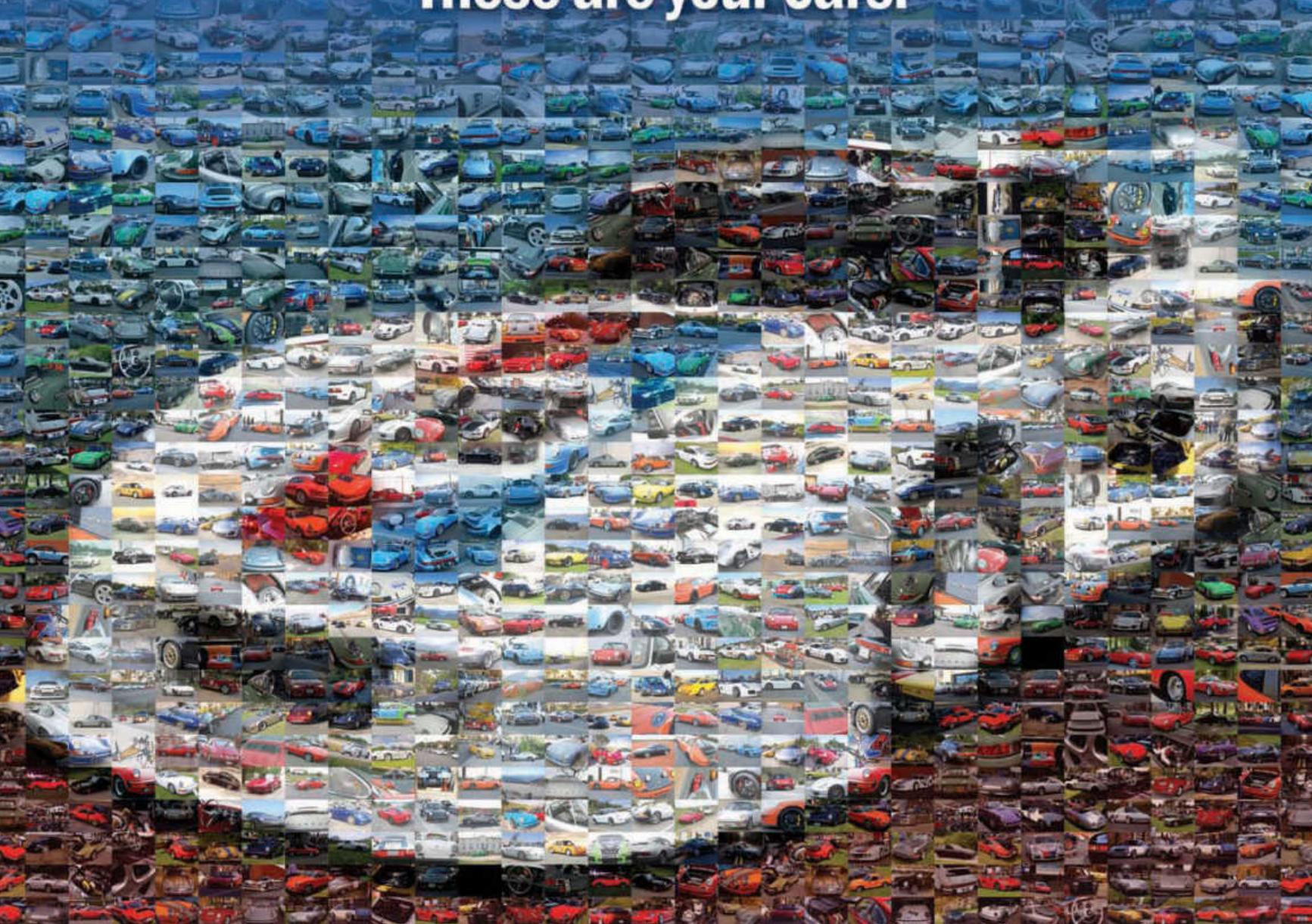
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BLOWN AWAY

The new 991 gets turbo engines across the range and as such that's a significant development, one that Porsche is making a big deal of. With more power and torque, plus increased economy, it's hard to see a downside in this new turbocharged world, but is that making a virtue out of necessity? We take a first drive

Words: Adam Towler

Photography: Porsche AG



It's a date to be imprinted on the mind of any Porsche enthusiast: the introduction of the mid-life facelift for a generation of 911s. Porsche has always successively tweaked its cars, introducing new technology, or responding to customer feedback and the advancement of its rivals.

In the modern, water-cooled era, there have been increases in engine size (Gen 2 996), and then a completely new engine (Gen 2 997), but this time there's not only a new engine, but also, crucially, a fundamentally different type of powerplant. For the first time ever, the regular 911 is going turbocharged.

The headline news, as you are probably aware of by now, is that a new 3-litre unit

featuring twin turbochargers replaces both the previous 3.4-litre and 3.8-litre naturally aspirated flat sixes. The new engine features a centrally placed fuel injector for each cylinder, fed by twin fuel pumps per bank, operating with a fuel pressure of 250 Bar. The 991 Turbo's (note the capital 'T') variable vane blowers are absent here, presumably to create clear marketing distance between the Carreras and the range-topper.

To turn a Carrera engine into Carrera S specification, Porsche change the compressor wheels within the turbocharger housings, fit a different exhaust and remap the engine management system. The result is that a Carrera produces 370hp at 6500rpm, and a Carrera S has 420hp at the same crank speed, with both engines

revving to a cut-out at 7500rpm. The eagle-eyed amongst you may have spotted that with this power output the Carrera S equals the first Turbo of the modern era, the 996 Turbo of 2000. At 1440kg, the Gen 2 991 is around 100kg lighter, too. That's 'progress', I guess.

However, it is torque that defines this new 911 engine compared to its immediate predecessors. With 332lb ft and 369lb ft respectively for the new models, not only does the Gen 2 991 comfortably exceed the peak twisting force of the Gen 1 cars (which had 288lb ft and 325lb ft at 5600rpm respectively), but given the new peak is developed constantly between 1700–5000rpm it doesn't take a genius to work out that not only will the new car be significantly more accelerative in real-



991 CARRERA 2S

Engine:	3.0-litre flat-six, twin turbo
Transmission:	7-speed manual/pdk, RWD
Body style:	Two-seater sports
Kerb weight:	1460kg
Economy:	36.5mpg (combined)
Top speed:	190mph
0-62mph:	3.9secs
Power:	414bhp at 6500rpm
Power:	369lb ft at 1700rpm
Price:	£88,245



New 991 sits 10mm lower than the outgoing car. Looks great in vibrant blue. Performance figures near identical to 996 Turbo, which was considered to be something of a sensation 15-years ago. That's progress for you

world driving, but that it will also require a completely different approach from the driver.

The new engine is hooked up to a development of the previous gearbox, once again available in both manual and dual clutch (PDK) formats. The ratios have been lengthened to suit the new engine's characteristics, and there's a twin plate clutch now for the manual car. A centrifugal pendulum on the dual mass flywheel is fitted on both transmissions; the aim, we're told, is to reduce driveline chatter enabling smoother, low-rev economy driving.

For the chassis, Porsche has finally adopted PASM as standard equipment on all 911 Carreras, regardless of the power output. The standard setup is now 10mm lower than on the Gen 1, with PTV torque vectoring standard on the S and rear axle steering (as seen on the GT3) available as an option. A sports chassis is also available as an option, which sits a further 10mm

lower to the ground, and offers stiffer spring and damper rates. Rear wheel width is half an inch wider for both cars, meaning the 20in rim on the S now wears a 305-section tyre. Brake sizes are up, with new four-pot calipers for the Carrera with thicker 330mm discs, 350mm discs for the S, and a

swathes of lava and jagged rock, as if a giant plough has churned the earth. Once we're clear of the town traffic the promise is of fast, empty roads that should be a perfect test for the new car.

Anyone familiar with a 991 will recognise the interior, the key changes obvious to the

“ It is torque that defines the new 911 engine in both the C2 and C2S ”

ceramic set-up now taken straight from the Turbo – which means the giant 410mm discs and six-pot calipers.

With all this information flying around inside my head, I climb first into a Carrera coupe with a manual gearbox. Ahead lies the alien landscape of in-land Tenerife, vast

eye looking straight ahead: a new infotainment system and the steering wheel. The former is PCM4, Porsche's latest crack at a cutting edge navigation and connectivity hub. It features a touch screen that recognises swipe and pinching gestures, and a whole host of functionality



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over the old system, but our time with the cars is short and I barely feel as though I've scratched the surface as to what it can offer. A proper review of it will require considerable time spent sat in a car working through the system at a later date.

The steering wheel is to the 918 Spyder

hitting the centre of the mode switch, which offers maximum attack engine settings for 20 seconds, complete with a countdown that appears on the right-hand dashboard dial.

A twist of the familiar key and the new engine is awake. The noise is

through traffic effortlessly, responding with only minimal lag to throttle input and then surging through the lower reaches of the rev counter. It's all so easy: there really is no penalty at all to using a Carrera as an everyday car now. Engaging into animated conversation with my co-driver – over the Cayman GT4, ironically – I actually forgot for a short while I'm driving the new 911. Is that a good thing or a bad thing? The engine may be quiet, but the first bout of strong acceleration reveals a chesty tone through the mid-range that reminds me a bit of a 964. It seems certainly more one-dimensional than before, more 'normal' somehow.

What has rapidly become obvious is that the entry-level car is a much more potent device than it was previously. For all our misgivings about losing the naturally aspirated engines, the old 3.4-litre motor felt like it had been given a near-impossible task to carry out: with the weight of the 991, the long gear ratios

**“The noise is
unmistakably flat-six,
but predictably different”**

style, with much more sculpting to the rim and, on this particular car, a circular switch down at the 4 o'clock position. This is the new 'mode switch', which allows the driver to select driving modes more conveniently, and features 'normal', 'sport', 'sport plus' and 'individual' settings. There is also a performance boost function accessed by

unmistakably flat-six, but predictably different. This is a deeper, mellower tone, without the rasp and injector clatter at idle of the old motors. In with the clutch and it's very light, requiring very little muscle at all. Selecting first is easy, too, the baulk of the early Gen 1 manual 'box long since eradicated. The Carrera gains speed

This is what all the fuss is about! New engine is essentially the same in both the Carrera 2 and the Carrera 2S. Each is a 3-litre flat-six producing 365bhp/332lb ft and 414bhp/369lb ft respectively. The differing power outputs are achieved thanks to different fuel, ignition and boost mapping between the two models, plus the Carrera 2S has bigger turbo impellers. Internally, though, the engines are identical. The spread of power in each is, as you would expect, linear and, compared with the outgoing normally aspirated engines, it's the increased torque that really makes itself felt.



New grille with horizontal slats, plus revised rear apron and lights differentiate the 991 Gen 2 model. Tenerife proves to be a great testing location

to help meet emissions tests, and also the pursuit for a headline power figure competitive with rivals, there was a sense that the driveability of the Carrera had suffered. In the mid-range the car made a lot of noise, but forward motion was not so impressive. Those days are very much over: once the Carrera has reached boost it's off, with the mid range between, say, 3000–5000rpm particularly strong, making it a formidable overtaker. You could drive the car like this all day and make excellent progress for very little effort. Keep your right foot buried on the accelerator and the engine spins with enthusiasm up to the redline, but there's the distinct impression that the last 1000rpm band of revs gives you little extra reward after the power peak, and may be more about not upsetting fans of the old engines than for any real-world gain.

So focused am I on the new engine that the rest of the Gen 2 991 package takes a

little longer to form in my mind. One thing that's immediately apparent is that Porsche has taken an appreciable step forward with the electric power steering system, because in terms of weighting and response this has a much more fluid, natural feel to it. The loading is light, but then the modern way of substituting feel for additional weight never did seem very appealing. The wheel in the 991 doesn't wriggle and writhe as we drive down the road, but there is detail there, and it shows that with development this is one modern technology that can be made to work surprisingly well.

I'd like to write that the Carrera S has a separate, dazzling personality all of its own. However, it only takes a mile or so to discover that it is almost identical to its little brother, but faster. I shouldn't be surprised: the engines are almost identical, and certainly the same internally, so it stands to reason that their character is the

same. Is there a little more turbo whistle with the S? Possibly. There does seem to be marginally less turbo lag, although why that should be so I don't know. I'm driving a PDK S and the spec is on the light side. This is an important point. As with before, there's plenty of additional technology you can add onto the new Carreras, and I think more than ever this shapes the car you finally end up with. For a start, torque vectoring is standard on an S, but then there's the £2388 for PDK, the £5787 for PCCB, the £1530 for rear axle steering and the £1125 for Sport Chrono. Purchase the £2186 PDCC (those ill-liked active anti-roll bars) and you have to buy the rear steering tech, too.

Before I get to contemplate this vanilla spec S in more detail, the engine immediately impresses. At £85,857 the S is nearly ten grand more than the standard car, but given most new 911s will be bought on finance, and the extra kit you





With all the excitement of the new engines, it's worth reflecting on the 991's continuing adherence to the 911's classic silhouette, which, after all, is much of the old-stager's charm

get, this seems like money very well spent. The additional torque brings the 911's chassis alive, finally giving that extensive rubber something to think about. Third gear really contains some punch now, propelling the S out of uphill 90-degree corners with real conviction. In the Gen 1 car even second gear might have allowed the car

probably leave the new car way ahead. Come to a corner and the old stager wouldn't see where the new car went. Essentially, you can drive the Carrera S almost manically fast and it stays flat and composed, tyres nibbling at the Tarmac until they start to whisper a faint protest, ceramic brakes repeatedly wiping off speed as if the

Yellow S, with PCCB, RAS and a manual 'box, with a smile writ large across his face: reckons it was a real blast. There's no time to try it, but it feeds the belief that spec choice will be critical with the new car to get the best from it – or to craft it how you really want it.

So, my first experience of the Gen 2 991 leaves me with nearly as many questions as it does answers. I have no doubt though that Porsche have made a profound step forward over the old car: this is a much better 991. But what about as a 911 – that's a harder question to answer. A fair chunk of it hangs on what you see the 911 as in the modern era. Is it a multi-faceted GT? If so, the new car arrows the target like Robin of Sherwood on a good day. Is it a sports car that makes you want to get out of bed early on a Sunday morning just to sneak in a quick drive? If you believe that to be so, I'm currently not sure whether the Gen 2 991 is the kind of 911 you're looking for. PW

“ Spec choice will be critical with the new car to get the best out of it ”

to bog down momentarily.

I don't think you'll be surprised to hear that a Gen 2 Carrera S is a formidably fast car. It'd take a 997 Gen 1 Turbo to put any distance on a Gen 2 Carrera S, and even then the turbo lag on a winding road would

car has just driven into a trawler's net. Even the ride quality appears nicely composed.

What it doesn't do is make my heart sing like a Cayman GT4 does, or for that matter, a Cayman GTS. A colleague who I respect a very great deal steps out of a Racing



Details! Retractable wing keeps the 911's profile intact until downforce is required. Roof panel retracts externally so as not to compromise interior headroom



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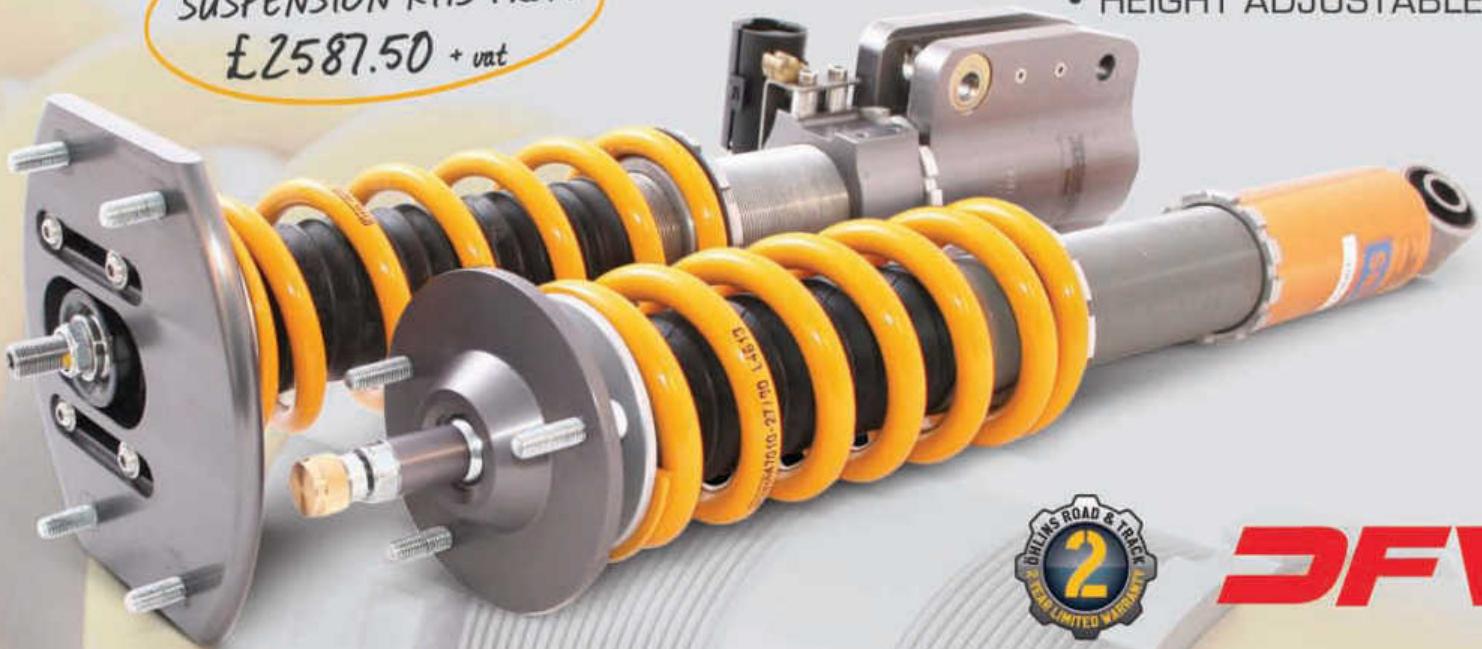
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ATTACK OF THE CLONES

This black and white 964/993 duo epitomises everything that is right about the Porsche tuning scene. The 964 is a family built affair, with help from specialist Redtek, while the 993 comes from Heritage Autowerks. Both ooze stripped out function and connected driveability in a way that modern 911s fail to achieve

Words: Adam Towler

Photography: Tom Gidden



Two modified air-cooled 911s: nothing new in that. And yet, somehow this feels refreshingly different, given that the past couple of years have seen values become the overriding topic of conversation whenever the subject of air-cooled cars arises. Who would meddle with an air-cooled 911 when it's rising substantially in value every month? Thankfully, there are plenty of people who still do, and *911 & Porsche World* is about to have a refresher course.

Today we have an example of the final two generations of air-cooled 911s, each one with a unique brief. The white 964 has been created as a bespoke track-focused 964, rather than an RS clone: the black 993 as a comfort 'RS', never destined for the track, but painstakingly developed to be in its element on the public highway. I didn't realise I was going to be in for such a treat when I arrived at our photo

location this morning. Here's why.

I begin with the 964, because it seems pragmatic to approach this in chronological order. This project began as a 'tidy up'. Some tidy up: the 964 before me now, in a sodden forest while it awaits attention from Tom Gidden's lens, positively glows in the meagre November daylight. There are cars where it's patently obvious love, care and attention has been lavished on them, and this is one such machine.

"I've had the car five years", says owner Roger Harradine, "and a 3.2 Carrera for two or three years before that. We saw what the market was doing at the time, and bought this left-hand drive Carrera 2 in Germany, which had absolutely no rust on it at all". The 'we' in all of this is Roger and his two sons, Garth and Ryan. Both sons work in the motorsport business, Garth for racing teams including years in F1, and Ryan in composites, and the ramifications of that soon become clear when I start to

notice the various pieces of carbon fibre that appear all over this car. Roger has spent a lifetime with cars, too, working on them and racing them in South Africa, where he has spent the majority of his life, including qualifying 11th for the prodigious 1973 Kyalami nine-hour race in a Chevron B19. So clearly Roger knows his cars, and can pedal more than a bit, too. Between the three of them all of the work on the car – bar the engine and 'box – was carried out 'in-house'. "My boys are nuts about cars as well", says Roger with understandable pride: "One of the really nice things about the project is that we've been able to do it all together." As a father myself, I think I can understand that.

Originally Guards Red, after a classic case of 'project escalation' the bodyshell was stripped and then acid dipped, removing all the sound deadening and underseal, before being strengthened, sealed, etch primed and painted white.





There's no escaping the influences here. This 964/993 duo are both singing from the RS spec sheet in terms of style and looks

Every bolt and bracket on the car was either replaced, powder-coated or re-plated throughout. Carbon fibre has been used for the spare wheel tray and cover under the bonnet, the gearbox undertray and the rear wheelarch liners; it gives the car an immediate air of sophistication, not to mention heightened expectation on my part.

All the suspension components were soda blasted and then clear coated, the car now running on KW adjustable coilover dampers at the front and the rear, with H&R anti-roll bars, a carbon strut brace and all joints poly bushed. The set up is fully adjustable.

For the brakes, Roger and his boys have gone with 'Big Red' Turbo discs and calipers, with four pot calipers at the rear that feature carbon fibre dust covers. There's a Turbo master cylinder and reservoir, with the fluid transported via new stainless steel brake pipes and flexible braided brake hoses all-round.

The G50 gearbox has been fully serviced by Porsche specialists Redtek in Brackley,

and features a ZF limited slip differential, an RS short-shift linkage clutch and flywheel, and a carbon gear lever. It's connected to one of Redtek's potent 'Cup Spec' 3.8-litre motors that's good for 320bhp and a stunning 400lb ft of torque. With a compression ratio of 11.5:1, atop the balanced bottom end are heads with modified rocker shafts, competition springs,

to take it for a drive. Climbing into the left-hand seat always feels more natural in a 911, whether we like to admit it or not, and the driving position once there is far more preferable, my hips not twisted inwards as they are when the wheel is on the right. The interior of this car is a mixture of no-nonsense motorsport spec, but with the cleanliness and attention to detail more akin

“ Every bolt or bracket was either replaced, powder-coated or re-plated ”

'Cup'-spec cams and 'blue' higher flowing fuel injectors. An exhaust with the centre silencer replacement mod promises plenty of that inimitable, deep-chested 964 rumble.

So, I've read the spec sheet, discussed the car with Roger and pored over endless details that can't fail to delight. Now it's time

to a show car. Wedged into the tight embrace of the Recaro SPG seats, my eye falls on the Alcantara-covered dashboard, then the Momo 'Volante' wheel, and finally to the large central rev counter with its white face. To the right of it is a carbon cover where the clock once was, with



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warning lights for the fan belt and alternator, and below more carbon panels and a centrally mounted starter button. Everything from the lightweight carpet set to the headlining is new, and carbon fibre (again) can be found on the floor and on the parcel shelf. Even the accelerator

there's no trepidation, just excitement.

Roger has warned me that I might find the car harsh, what with its leaning towards circuit use. Maybe I'd been expecting it to be all jolting ride, grinding, rattling transmission, engine vibrations and weighty controls: I'm prepared for a work

swift but easy progress, or then rev the blazes out of it and absolutely fly. The long, silver-topped gear lever is connected to a gearbox with a shift quality that will make almost any modern car owner weep – it slices around the gate with just the right amount of resistance to describe the mechanical interface going on out of sight.

Even better than the raw performance is how the car actually drives. It's a perfect example of how right the original 911 'package' is – and by that I mean the interior and exterior dimensions, the ergonomics and the car's footprint. There's plenty of room inside the cabin, but at the same time I can reach across and touch the passenger side door top with ease. On a typical country road such as this the car feels so narrow, so biddable, so easy to place. In a modern 911 I'd be concentrating on simply following the road: in this 964 I'm thinking about my cornering line within my own lane. That's the difference.

The steering is a delight. The amount of lock is limited, which makes parking manoeuvres a chore, but it's hyper accurate on the move and beautifully weighted. Just a slight increase of pressure on the rim is all that's required

“ It sounds heavenly, all rich and woofly low down, rising to a scream ”

pedal is Kevlar, an additional surface to aid heel-and-toe operation. This is emphatically not your average go-faster 964, oh no.

With a light tug on the RS door pull the door closes and it's time to go. The Safety Devices roll cage provides an air of solidity, exaggerated by sitting low and securely in the car. With the wheel and pedals at the perfect distance for me, I feel completely part of the car, and that's before the wheels have even turned an inch. Therefore, when the 3.8 whumps into life with a press of the starter button

out, especially on the quintessential B-roads that form our quick test route. Not so: the engine is very well mannered, and delivers its additional performance in one long rich seam of torque, as the numbers suggest. It sounds heavenly, too – all rich and woofly low down, then rising to a classic flat six scream as the revs pile on energetically. Performance, given a kerbweight of around 1100kg, is stunning, especially the way in which the prodigious torque pushes the car forward at any revs, any time. It brings a duality to your driving style: either row along on the torque for



Winging it. Both 964 and 993 exude modified attitude and create a soundtrack that's old school, air-cooled. Oh, and nothing looks quite as cool as a slammed 911 with fat wheels that fill the arches

mid-corner to alter the direction of the car. Once the car begins to turn there's an exhilarating feeling of it pivoting somewhere directly beneath the driver's seat. It stays just the right side of nervous, but you never have to worry about it turning in. Having had this brief glimpse into its character on the road, I'd love to try it on a circuit, but even so this is a car I'd enjoy on the public road as often as I could. Even the ride quality isn't overly aggressive.

What, then, of the 993? Although it looks just as sportingly focused as the 964 from the outside, this Basalt Black car is actually rather different. It's the work of Greg Cranmer at Heritage Autowerks in Langley, Berkshire. We've driven a few of Greg's cars recently, and talked about his work quite a lot, not least because he handles everything 'Singer' in the UK. I've been impressed with what I've driven so far, but nothing prepares me for this 993.

"The owner already has a collection of cars", recounts Greg, "He wanted a pure road car that looked really sexy, had lots of RS bits, but that didn't drive like one." In other words, the owner wanted comfort, usability and a sporting drive. That's not to say that this car is all-show-and-no-go,

rather that it was created with a clear brief from the start. Greg believes that's the key to ending up with a cohesive car, and says he goes to great lengths to find out what the customer really wants from the car, and how he'll use it.

In this instance there was no expectation to take the car onto a circuit, so compliance was prioritised. To that end, the car features normal suspension top mounts instead of the RS items, with softer Bilstein dampers and H&R progressive rate springs. The car sits at RS height, with the geo settings of the RS car, but without the harshness and nervousness over road cambers that can affect the RS, particularly in the UK. "On the road you can hustle it faster than an RS for that reason", says Greg, which is a bold claim, albeit one that sounds logical. The brakes and wheels are all standard Porsche factory RS items – and what wheels they are, too, it feels as though these split rim alloys have haunted my car-led dreams for decades. In conjunction with the Porsche factory RS bodykit they make this arguably one of the best 993s to look at, in fact, one of the most attractive 911s ever. Up close and in the metal, it is simply stunning. That impression is aided considerably by the full

respray, and a neurotic attention to detail that bears more than a passing resemblance to the uncompromising eye of Singer in California. Almost everything you can see on the car is new: all the light lenses and trim pieces have been replaced, and there are LED bulbs fitted – apart from the headlamps, where Greg uses a PIAA competition bulb to good effect. "I never found a HID unit that will last", he says with a shrug.

All of which means it's hard to believe that the donor car for this project was a 100,000-mile, sound, but tired, 993 Carrera 2. Today, as a rare beam of sunlight dances across the curvaceous flanks and catches for a microsecond on the wide tray spoiler, it looks to all intents and purposes like a brand new 993 RS. An 'RS' defroster-free rear screen, devoid of a rear wiper blade, adds considerably to the effect.

Even so, that's nothing compared to the interior. It's the seats that catch my eye first, and no doubt yours, too. They're wider, Recaro 'Furious' items, trimmed in natural pale brown 'aniline' leather, with classic Porsche hound's tooth cloth centres. They've been teamed with new, jet black carpets, covering some additional





sound proofing put in place by Greg, and a Heigo half cage. The car retains electrically adjustable mirrors, a sunroof and air conditioning, and now features a Porsche Classic sat nav system, but the rebuilt gearbox now has an RS linkage – as you can see, it's a car full of contradictions, but

move, but with a sound blast at high revs that presses all the right buttons. This is another great gearshift to be experienced, and a spot-on driving position, the Recaro mounted low and the genuine 993 Cup steering wheel at exactly the right distance. I've barely driven 500 yards and already

that sits beneath the handbrake lever. It probably had 20-years' worth of fingernail scratches on it, but there'd be nothing unusual in that. Instead, it's spotlessly smooth. It's a brand new factory part. And while that may be a tiny point, it's just one thing that I reckon my brain subconsciously registers over and over again, along with the absence of anything approaching a rattle, and the sheer tightness and togetherness of the car. With every last element of the suspension replaced with new parts, this 993 goes exactly where you point it with complete conviction.

It might seem a banal point, but the ride quality of this car is astonishingly good. One look at the wings and the wheels and you'd never guess that this car is as comfortable over bumps as any modern performance car, not just in terms of suppleness but also in the manner with which it processes those bumps and ridges.

The engine is perfectly adequate for road use, the pre-Varioram spec motor requiring some revs on the dial to give its best, but

“ This 993 goes exactly where you point it, with conviction ”

The 993 is a pure road car, whatever the roll cage might suggest, and so needs to be useable. Leather trimmed Recaros feature hounds tooth trimmed inserts. On the move it's solid with not a squeak or rattle to be heard

that somehow really gels together when experienced 'in the metal'.

Clicking the red seat belt into place and firing up the standard 993 Carrera engine sets just the right tone. The exhaust is the work of Heritage Autoworks as well, and features 200-cell motorsport cats. It has a terrifically deep tone: bass-heavy but sophisticated at idle, never intrusive on the

I'm grinning like an idiot.

Part of the reason for that is this genuinely feels like driving a new 993. If the outside started the illusion, then the interior rams the point home convincingly. Greg has replaced so many small parts that might otherwise have been left in situ, even though they were probably more than serviceable. It's stuff like the plastic section





then with a gearshift like this one, that's absolutely no hardship. In any case, Greg has a plan to introduce considerably more performance: he's currently building for the owner a 3.8-litre engine with Mahle barrels and pistons, Jenvey throttle bodies, modified heads with Cup-spec cams and all the other goodies you might expect. When finished, the peak power output is expected to be in the region of 330–car350bhp. However, and while I've no doubt it'll be absolutely spectacular with the big engine in place, there's something really appealing about the car as it is now. Calling the engine 'adequate' just now might seem like damning with faint praise, but in an age where performance seems to rule everything, the fact that you can drive this 993 really hard without logging too many anti-social numbers on the speedometer is something to cherish. For me the best part of the car is the way in which it attacks a sequence of corners: poised, controlled, but sensitive to every slightest thought of the driver. Personally, the past weeks have

been one long obsession with the new Cayman GT4, but I have to admit that this 993 reduces even that stellar machine to something altogether more ordinary feeling. As it is our drive is over all too quickly, although that's probably just as well as I'd still be haring around now if I could.

Articles such as this one aren't about what's best: there is no winner and loser. But just this once I asked myself that very question for fun, and honestly couldn't answer it, because I find so much to like in both cars. However, what it has done is increase the want factor for an air-cooled 911 to painful levels.

The Heritage Autowerks car is a 911 project elevated onto a plain I've not hitherto experienced. What sets this car apart is the sheer attention to detail. Want an example? The sunroof switch has been moved to the centre of the three buttons mounted low down on the centre console, with blanking plates on either side given the moveable rear spoiler has been replaced. It could have been left on one side, but that

wouldn't be symmetrical, and so it had to be changed. It takes time, thought and money to be so exacting about a car, and on its own it's a tiny thing, but when the whole car has been approached in that manner then it all adds up to something very special.

The white 964 is just as special in its own way. Dripping in exotic materials and an absolute riot to drive, it's the product of a very special, emotive development process. That it is currently for sale means more people will get to experience what it has to offer. If you're interested, contact Nick Fulljames at Redtek for more details, and expect the price to be somewhere in the region of a new, nicely-optioned 911 Carrera S. As for the 993, approach Greg with a little less money than that and I'm sure he'd be delighted to build you something similar to the car here – or perhaps something rather different. That one's down to you. Me, I'll just continue to whinge about those air-cooled prices, and rue not buying one when I could. Maybe, one day... PW

Above: Follow you, follow me. Which would you choose? The 964 is more road racer, while the 993 is a tad more refined. Both excite, though

THANKS

Roger Harradine and Nick

Fulljames: Nick at Redtek is on 01280 841911 redtek.co.uk

Greg Cranmer at Heritage Autowerks: heritageautowerks.com 0330 2233911



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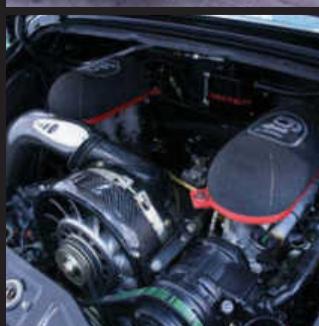
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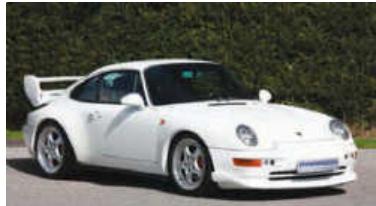
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18" Split Rim Wheels • 3-Spoke Steering
Wheel • 58,240 km (36,400 m) • 1995 (N)

£249,995



911 Carrera RS (964) LHD

5-Speed • Maritime Blue Triple Tone
Leather Bucket Seats • 17" Magnesium
Cup Wheels • Rear Roll Cage
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£224,995



911 GT2 (996, 6-Speed)

Polar Silver • Black Leather Sport Seats
Porsche Ceramic Composite Brakes
Large Carbon Interior Pack • 20,892
miles • 2003 (03)

£144,995



911 Carrera 2 S (991)

7-Speed PDK • Guards Red • Black
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Satellite Navigation • 20" Carrera 'S' III
Wheels • 17,837 miles • 2012 (12)

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911 Carrera 4 S (997 GEN II)

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Seats • Touchscreen Satellite Navigation
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2010 (60)

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911 Carrera 2 S (997 GEN II)

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Leather Sport Seats • Touchscreen
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THE RIGHT STUFF

With the 911 becoming ever more a GT car (GT3 excepted), Porsche has seen fit to equip the mid-engined Cayman with some serious firepower. The Cayman GT4 is the result and currently it's the best Porsche sports car bar none

Words: Adam Towler **Photography:** Tom Giddons



It's the car so many of us have been waiting for; I know I have. Ever since the original press launch drive of the Gen 1 987 Cayman S in Tuscany in 2005, there's been this deep longing for Porsche Motorsport to get their hands on a Cayman and give it a bit more, well, attitude. After all, as good as the Gen 2 987 Cayman R was – and it was, and is, very good indeed – there was still a big 'what if'. Just what if the Cayman received some genuine 911-grade firepower, both in the engine department and chassis?

Over the following 10 years we've driven many aftermarket Caymans in these pages that have sought to offer

exactly that. Some have been a mild evolution of the standard car, and some have been fairly vicious: all have rewarded the driver, but they've also kept the flame burning, inside this writer at least, for an official car that tackled head-on the same challenge. Now, here it is.

We've driven the GT4 on the launch, and more recently I was lucky enough to punt one around Spa Francorchamps courtesy of Ron Simons and his RSR Nurburg track day venue and car hire business. On an overwhelming day the GT4 still managed to stand out, but it had some formidable company in the form of the rolling, sweeping track topography of Spa, and a 991 GT3. On the track, the

GT3's engine and whip-crack PDK gearbox really came into their own, so I was hard pressed to choose a favourite between the two cars. The GT4 was certainly the friendlier car to drive, and I had the distinct feeling that I could have lapped all day long till the sun went down and neither the car nor I would have had enough.

Now I have the chance to really drive the GT4 in the UK. We've decided on Snowdonia in North Wales, and in particular the 'EVO Triangle', a – unsurprisingly – triangular shape of connected roads made famous by the eponymous car magazine, and now a popular car enthusiast's destination. We



CAYMAN GT4

Model tested:	Cayman GT4
Engine:	3.8-litre flat-six
Transmission:	6-speed manual, RWD
Body style:	Two-seater sports
Economy:	28.5mpg (combined)
Top speed:	183mph
0–62mph	4.4secs
Power:	380bhp/310lb ft
Price:	£64,451



Slammed! Cayman GT4 featuring optimum 'stance' accentuated by deep GT3 style shovel nose and a rear wing that means business

might not be that original in our thinking, but the mix of long slogs there and back combined with fearsomely challenging roads at our location should put the GT4 through a serious test.

When the GT4 gurgles purposefully off the Porsche truck my 'car world' changes perceptibly. It shifts slightly on its axis, and I know right there and then that things can never be quite the same. There are some cars that simply look right, and the Cayman GT4 is one of them. It's not just that the Cayman is an attractive car, and the revisions for the GT4 make it look considerably more purposeful still. No. It's the accumulative effect of its design, size, stance, branding, purpose and noise; all whipped into one giant Weissach mixing bowl and then baked to perfection. Some don't like the sizeable rear wing planted on the rear hatch, but I think it works beautifully. The GT4 screams aggression, from its GT3-style shovelnose and vents, to its extended monogrammed side air intakes

Optional bucket seats come straight from the 918 Spyder and add an extra £1907 to the price, but are essential for bonding with the Cayman GT4 experience. Gearbox is six-speed manual only

and the high-rise rear wing angled provocatively into the airstream. It simply makes you want to drive.

I don't need asking twice. I clamber ungraciously inside the cockpit and contemplate for a moment my surroundings. It's all typical modern

scattered around, but otherwise the most immediately obvious element is the seat I'm sat in. These are the 'Bucket Seat' option, and they're an extra £1907, but they are amazing: don't order a GT4 without them; the standard seats simply sell the car short.

“ Some cars simply look right, and the Cayman GT4 is one of them ”

Porsche, but there are some pleasing highlights: the optional red stitching on the dashboard, and extra leather trim (£1344 to you, sir), and the RS-style door pulls. The 918-style steering wheel is slightly smaller than the normal wheel, and trimmed in Alcantara. It has a firm, sculptured feel. It feels good. There are a few GT4 logos

This particular car features some other optional extras, chief among them being the carbon ceramic (PCCB) braking setup. As it stands, the GT4 gets the braking equipment from the 991 GT3, so that means steel 380mm discs at each corner, with six-pot front calipers and four-pots at the rear. With the £4977 ceramic option, those disc sizes





On the right road the Cayman GT4 excels. Corners are its forte, and now it's got the firepower to rocket out of them and demolish the intervening straights

rise to 410mm and 390mm front and rear, which is what is fitted to 'PGE'. All told, the extras take the list price to £78,479, quite some rise from the £64,451 list price. But let's take a second look at that. At under £80,000 this car still seems like good value for money, given its technical makeup: over my shoulder now sits an engine lifted from a Gen 1 991 Carrera S, which means 385hp at 7400rpm and 310lb ft from 4750–6000rpm. Given the GT4 is relatively light at 1340kg DIN unladen, that equates to a top speed of 183mph and 4.4 seconds for 0–62mph. At under £65,000 it starts to look like a complete steal, relative to what you're getting, and it's therefore no wonder that GT4s in the UK are becoming like unicorns.

If the aggression of the aerokit hadn't given you a clue that this was no ordinary Cayman, then the whump of the engine firing into life certainly will do. Exhaling through a twin pipe exhaust in the usual centre-exit position, the GT4 has a bassy note that's instantly more commanding than any other Cayman. It's amazing what 400cc can do, but it gives the little Cayman the presence of its big brother in many ways. Another sign of impending performance is the action of the six-speed manual gearbox action. It's beefed up for this application, and has that definite Porsche GT-car heft and precision to the way it works. It feels much like the 'box

in a Gen1 997 GT3 to me.

The Cayman GT4 is a stiffly suspended car, but by no means an uncomfortable one. It has an uncanny knack of building a rhythm with the road so that over long distances you almost drop into a hypnotic state with the way the car is working. I used to find the same phenomenon in 997 GT3s, where long journeys actually become a pleasure and even the sound system doesn't seem that necessary. The flat six is always there with you in the cabin, even when you're at a motorway cruise. And if you should let the speeds rise just a tad – off the public road, naturally – then it fills the cabin with a constant, busy roar that makes the driver feel as though they are really cracking on. The miles tick by, we cross over into northern Wales, and so far have barely left three-lane blacktop, but already I feel like I know the GT4: like it's a car that has something to say, and says it. There aren't enough of those kind of cars being made in the present era, but it's not something you could ever accuse the GT4 of not doing.

Inevitably, the dull, boring roads give way to rather greener, more exciting ones, and suddenly I realise that there's no other car in the world I'd rather be driving right at this moment. The Cayman gearing still feels long, but the added brawn of the larger capacity engine makes short work

of striding through the rev range, and even better is the way it goes about it. Once the 'six' has burst into the middle of its rev range it makes this deep, chewy six-cylinder noise that bellows sheer muscle. In fact, it's full of good noises, which constantly evolve, so you can play little tunes with the accelerator pedal if you're bored, and the game never gets old. Sooner or later, it is time to really let fly, and the result is a scream of revs and a rev counter needle that flies past 7000rpm and onwards. It's this facet of the GT4 that has been a point of discussion, particularly in the press so far: does the GT4 feel ordinary compared to the GT3? My take on it is simple: 'Yes, but then what did you expect for a car at only two thirds of the price?' It comes as no surprise that an engine prised out of a regular 991 Carrera S can't compare to the bespoke unit found in a 991 GT3. The GT4 doesn't explode with the same fury at the top end; doesn't make that spine-tingling hissing noise from the finger followers as the 9000rpm rev limit approaches. If you're expecting that then, frankly, you're misguided. However, compared with most other performance engines this is simply beautiful. We all know that high revving, naturally aspirated performance engines are rapidly becoming extinct, so let's appreciate them while we can.

In any case, the engine in the GT4 is

merely a pleasant device that gets you from one enjoyable experience to the other, and those are namely the corners. It is a car with enough power, and I never find myself hankering for more (well, not until I think about putting the GTS's powerkit engine in there, and gaining a bit more top end ferocity). Instead, it's the sensations that come back through the attractive steering wheel that really excite.

The GT4 uses a front suspension layout largely taken from the 991 GT3, including a 13mm wider track than the regular car, and a ride height dropped by as much as 30mm over the standard car (PASM-equipped Caymans are 10mm lower than standard, and cars with sports suspension are 20mm lower). On the rear axle there is reinforcement, a mechanical limited slip differential with electronic control and torque vectoring. The springs and dampers are firmer rate 'upside down' Porsche Motorsport items like the GT3, with PASM, so there is the familiar 'normal' and 'sport' settings – the former apparently designed for the Nordschleife, the latter for modern,

smooth racing circuits.

The GT4 possesses almost all the qualities found in a regular Cayman S. There's that same innate balance, the accuracy of the steering and the natural athleticism. But it is quite a different experience at the same time. While the 981 Cayman steers accurately, its electrically assisted steering rack is not blessed with feel. In the GT4 the system takes a substantial leap forward, with a weighting and response that echoes the improvement made from Carrera to GT3. It's a weightier, more natural response when you turn, and a much clearer representation of what's happening down at the front wheels. The entire car feels as though it has been pulled up by its boot laces: it's so much more taut, controlled, decisive. The ever so slight layer of friendly mush found in the standard car is gone, and this is the cold, hard steel exposed underneath. When you commit the GT4 to a corner you do so with an incredible amount of confidence, borne of all the

aforementioned attributes, and yet it's not dull. Oh no. Get hard on the power and you'll feel the rear axle digging in and then starting to slide, but somehow it manages to be both friendly and yet exciting. That's a tough trick to pull off.

On the fast, sweeping roads of the triangle, the GT4 is supremely surefooted. I can't tell you exactly what the aero package is doing, but the car definitely has a noticeable poise at higher speeds. Then there are the brakes, which are simply brilliant. At very low speeds or even rolling with the engine off, the sound of pad scrapping discs fills the cabin with an excruciating tearing sound that, for most people, I suspect will be like finger nails scraping down a black board. When you're up and running, though, their retardation is magnificent. On a number of occasions I leave my braking very late for a tight, clear sighted corner, and trail brake deep into the apex. More and more the pads bite, all relaying what's going on at the disc via the ball of my foot. Combine it with a heel and toe embellished flick down the 'box,



A normally aspirated, manual, driver focussed Porsche. Frankly, these days, Porsche doesn't need to bother, but not to build such cars would be seen as a betrayal to the sports car die hards, both within Porsche and outside

facilitated by short, sharp movements of the gear lever (there is a rev-match function in Sport Plus mode, but frankly, that just feels like cheating in your maths homework and then taking all the credit) and the GT4 feels absolutely dialled into what you're trying to do.

Once you start to string together whole sections of road in this manner not only is the pace very high, it's completely engrossing. There may be faster cars, but it's hard to see many getting away from a committedly driven GT4. We even meet a fellow Porsche enthusiast, out for a top-down drive in a 987 Boxster S. The bark of the GT4's exhaust through the trees seems to stop him in his tracks, and he pulls the silver car over to the side of the road and watches the passes for the camera. That he turns out to be an off-duty policeman, too, makes me all the more thankful he's a die-hard Porsche fan. The grin on his face says it all: the GT4 really rocks his world.

With stomachs rumbling photographer Tom and I retire to a roadside caff for some refreshment. Studying intently my sausage and egg sandwich, I'm suddenly aware of a polite 'excuse me' spoken by a man that's appeared at the side of the table. "Is the GT4 yours?" he says hesitatingly. "Yes", I say, before beginning to mumble something awkward along the lines of 'well, no, not

actually'. "Do you mind if I take a picture of it?" he adds quickly. "It looks absolutely amazing. I can't believe I've seen it. I thought I'd come and drive the 'Triangle' today, but I never thought I'd see one of these. I asked my boy if he wanted to come along, but he didn't. He'll be so upset now". Our new friend rushes outside and begins to photograph the travel-stained GT4 from every angle. After a minute or so he tells

awaits, battling with increasing nervous tension against the autumn light that is rapidly failing. I've wound the pace back in now, and spend a good deal of my time looking for photo opportunities rather than dissecting apices. The GT4 is still good company: the seats are amazingly comfortable, and it's feeling like home in here now.

It really is getting dark. Tom can't take

The grin on his face says it all: the GT4 really rocks his world

me he's planning on purchasing his own Porsche soon, but is unsure whether to go Boxster, Cayman or 997. It seems like one of the most important things in his life, a sentiment I think most of us can identify with. It's nice to experience how the 'baby' Porsche Motorsport car has ladies of kerbside appeal, and it won't be the only time today that it makes genuine waves. The fact that it's based on a Cayman doesn't seem to come into it: once the car has been identified as a GT4 that seems like more than enough.

A further few afternoon hours of driving

any more photos, although I sense he could keep snapping the GT4 for the rest of the night. The middle of Snowdonia suddenly feels a very long way from home, even though the winter daylight hours mean that it's only just gone 6pm. Back on the road in the GT4, then, and I elect to take a direct route. I soon regret that, imagining the moorland blast through the night I could be having at the same exact moment I'm stuck behind a labouring artic and a snake of impassive cars and their hypnotised drivers. Eventually the roads get broader, and faster, and traffic can be dispatched easily





On top of the world?
Well, perhaps not quite, but certainly on top of the sports car game, both in terms of its position within the Porsche hierarchy and outside competition

with the GT4's sturdier torque curve. Tiredness sets in, particularly after a food stop for car and driver. Yet still I'm enjoying the miles. As home gets closer it dawns on me that I'd happily do another 300 miles tonight, perhaps if I could get my head down for an hour or so first. What a strange feeling, when you bond with a car to

how it is when it comes to new Porsches. That might make editor Bennett's chair a little warm at times, but so be it: it's important the magazine tells it how it is. When PDK came out we lambasted Porsche over its ridiculous stance on steering wheel mounted paddles, and the configuration of the shifter; we've never held back on investigating the

person's subjective view, and that's one of the great things about cars: they all mean something different to different people. But having said that, I personally believe this is one of the best Porsches to be released for quite some time, and a car that will go on to be seen as a classic; a car comfortable in the company of some of the all-time Porsche greats.

All of which means that if you have been able to secure a GT4 order in the UK, you're very fortunate indeed. The car of the moment is on its way to you, and if it were mine, I think I'd always make every effort not to sell it. In equipping its smaller, mid-engined coupe with a bigger engine Porsche has finally given the Cayman the bite it deserved: in combining that with a hardcore sporting chassis and a good old fashioned manual gearbox, it may have just reawakened in the process the notion of what really matters in the modern performance car. **PW**

“Porsche has finally given the Cayman the bite it deserved”

an extent that you simply don't want to stop driving it.

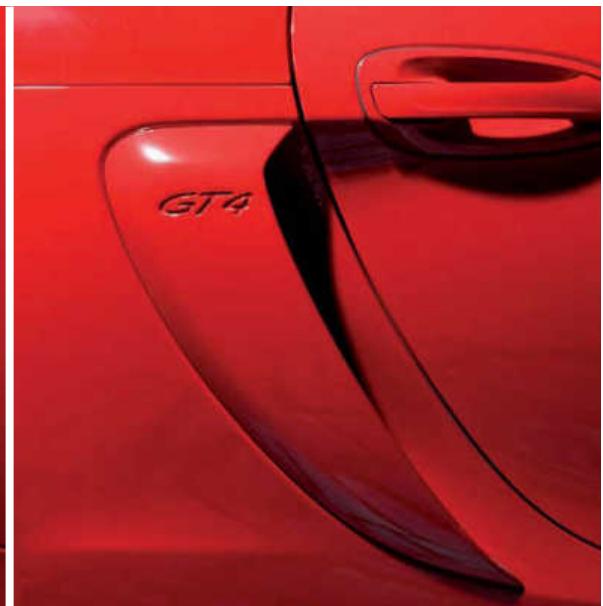
I think it's important for me qualify to an extent this lavish outpouring of praise. Although *911 & Porsche World* is a 'single marque' magazine, we're not afraid to tell it

M96/M97 engine woes, and we're quite prepared to label the Panamera as a munter in the styling department however much of a great car it is underneath.

So it's in that context that this praise should be seen. Of course, it's only one



Big 20in alloys are PASM controlled and shod with Michelin Pilot Sport Cup 2 tyres, specifically developed for the GT4. The massive PCCB discs and big six pot calipers complete a formidable handling/steering/braking set up





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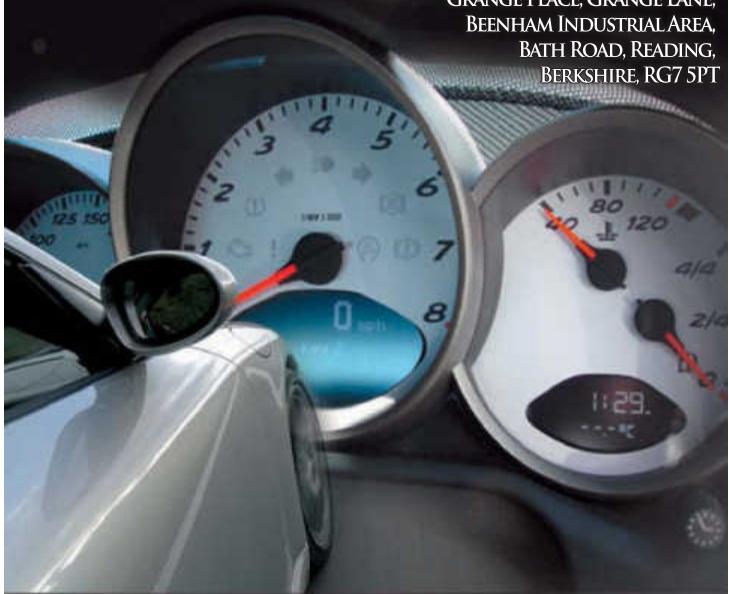
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GENEVA 928 FOUND

There was a huge fanfare and rolling of drums when Porsche introduced the new front-engined 928. We tracked down the actual 1977 Geneva show car in Portugal

Words: Johnny Tipler Photography: Telmo Domingues



Yep, we found it. A genuine 928 from the 1977 Geneva show launch. A cathartic experience that almost has me down on my knees in awe; it's the very car that started it off, got the 928 ball rolling, and here it is, surviving intact and unmolested. It belongs to our pal Pedro Diogo, who keeps it alongside five more 928s at his Coimbra home in northern Portugal. Not obsessed or anything – he also has a 912 with a 911 2.0 engine, a 1961 Porsche Diesel Standard tractor (the open wheel Porsche, he likes to call it) and a kart with a 956/962 body made in the '80s in the States to celebrate Jim Busby's "wins"! A man of eclectic tastes, Pedro.

Back in June 2011 we featured Pedro's hillclimbing antics at Caramulo with a 928 in 911&PW issue 207, and we've kept regularly in touch since then. So when he revealed to me that he'd acquired this Geneva icon I leaped aboard Pig Energy (my 996) and high-tailed it down to Plymouth along with daughter Zoë to catch the 24-hour Brittany Ferries crossing through the Bay of Biscay to Santander, and thence to Portugal. And here, in the precincts of a disused factory near Coimbra, Pedro gave me chapter and verse on the comings and goings of his latest acquisition.

Porsche introduced the 928 to the press in Provence, centred on St-Paul-de-Vence, in February 1977, and launched it at the Geneva Salon on March 17th, 1977. The 928 was a real show-stopper. One of a pair – the other was white – Pedro's red car took precedence, mounted on its dais with the nose angled slightly skyward. The white 928 was flanked by a 924 clad in Martini racing stripes (celebrating the previous year's Le Mans success with the 936), and the front-engined trio brusquely relegated the air-cooled 911s to the back of the Geneva stand.

The new model had been a long time in the gestation for a number of reasons: the Porsche family effectively handed the corporate reins to Dr Ernst Fuhrmann in 1971 at a time when US federal legislation presented a bleak picture for less ecologically friendly sports cars, and almost as soon as the stylists and engineers got to work, Type number 928 was delayed by pressure from the Stateside environmental lobby and a succession of recessionary fuel crises caused by Middle-Eastern conflicts, hence the seven year gestation prior to launch. However, with an eye to the most lucrative market at the time, it was a case of "if you can't beat 'em, join 'em," and Porsche built a front-engined V8 that would fit in a treat in the American market. Bear in mind also that when they began to consider the 928 project, the 911 was barely seven years old, and the car generally regarded as the bee's knees at the time, certainly in aesthetic terms, was the Ferrari 365 GTB/4 Daytona (1968-'73), a sleek, muscular front-engined bruiser, and actually not so dissimilar conceptually to what emerged from the Zuffenhausen drawing board. Having decided that a big V8 was the way forward, all of a sudden came the 1974 oil shock, and the engine capacity was accordingly down-spec'd to a more economical 4.5-litres. Ernst Fuhrmann's vision of a trans-continental express, unfettered by pressures to achieve competition success, was intended to take on similar products from Mercedes-Benz, BMW, Jaguar and Aston



The 928 was dubbed the 'Land Shark' and it's not hard to see why, although it's looking a little sorry for itself here, with its drooping wing mirror

Martin. It was not quite as powerful as the 930 Turbo, but it was a great deal easier to drive – and clearly calculated to appeal to a quite different character of driver.

There'd never been anything quite like the 928 'Land Shark'. Sure, Citroën had come up with the sleek and sloping Maserati-powered SM V6 in 1974, and the contemporary Corvette Stingray was, similarly, a long and languid coupé with bumpers incorporated into the bodywork – and a mandatory V8, to boot. The 928's 98.4in wheelbase was 0.4in longer than that model Corvette's, and the overall wheelbase was broadly similar, too, at 175.7in, although the Porsche was 10in shorter overall and offered two-plus-two seating that never existed in the 'Vette. And as for front-mounted engines, there'd been a precedent of sorts in the 924, drafted about the same time as the 928 but introduced a couple of years earlier. No, the 928 was indeed a very special piece of design. Head of styling at Zuffenhausen from '69 to '88 was Tony Lapine, who oversaw Wolfgang

Mobius's renderings to make the shark-like profile a reality. The menacing up-swept snout, flying-buttress rear window pillars and egg-shaped tail gave the 928 its distinctive shape, plus the pop-up headlights that, like the Lamborghini Miura's, stayed uncovered when lying flat in their niches. It's no coincidence that Mobius was assisted by the young Harm Lagaaij who'd been tasked with drawing the 924 and would himself go on to succeed Lapine and mastermind the 986 Boxster and 996 generation.

It wasn't just the styling that excited car buffs; the engineering was cutting edge, too. To save weight as well as explore the possibilities of deformable structures, the

doors, bonnet and front wings were fashioned in aluminium, while the bumpers were hidden underneath plastic aprons that wrapped imperceptively around the nose and stern, calculated to retain their profile after a minor impact.

Of course, Porsche was no stranger to eight-cylinder engines, having done a flat-eight for the 908, and shifts in engine capacity were rife in racing and not infrequent in the road-going 911, 912 and 914 models. But this was a brand new all-alloy 4474cc SOHC V8, owing nothing to any other manufacturer or previous Porsche powerplant, and it was also the first engine to feature Bosch K-Jetronic

toe changes during cornering and thereby reducing oversteer. That was big-time innovative in '77, sufficient for the 928 to win the European Car of the Year award for 1978, taking over that particular mantle from the Rover 3500 SD1... The 928 remains the only sportscar to win that particular accolade, kinda like winning the Eurovision Song Contest, but the marketing guys and the journos lapped it up.

Commenting in *Car and Driver*, June 1977, David Davis said, 'The 928 has been made as a dynamic dumbbell, with its major masses disposed at its extremities to give it a high moment of polar inertia. The effect of this has

“ It wasn't just the styling that excited, the tech was cutting edge, too ”

injection as a specific component. The front-engine, rear-mounted gearbox-transaxle concept also featured in the Ferrari Daytona, but made a lot of sense in the 928, evening out the balance front-to-rear. Transmission-wise, it was available as five-speed manual or Mercedes-sourced three-speed automatic, which Porsche re-programmed for better performance. Front suspension consisted of double wishbones and anti-roll bars, but at the rear Porsche broke new ground again and introduced the Weissach axle. This was a development of the semi-trailing arm setup, using articulated trailing arms pivoting in an arc about a forward locating point, while lower links flexed under load, countering unwelcome

been exaggerated by a deliberate attempt to keep the wheelbase short. Even more important than the polar moments of such a car is the position of its centre of gravity, which in the 928 is located ideally at mid-wheelbase.' Writing in the same issue, Brock Yates reported, 'I can't remember driving a car with more perfect ergonomics. The steering wheel and instrument pod adjust as a unit and the pedals can be moved to accommodate the short (driver). The engine is gorgeous, the best possible marriage of German and American technical acumen. There's torque all over the place and it stays smooth all the way to the 6300rpm red line.' Yates also commented of the press launch, 'A 911

Pedro's self same car as it appeared at the Geneva Salon in March 1977, where it very much stole the show, going on to take the 'Car of the Year' award, too, the first and last time for an out and out sports car



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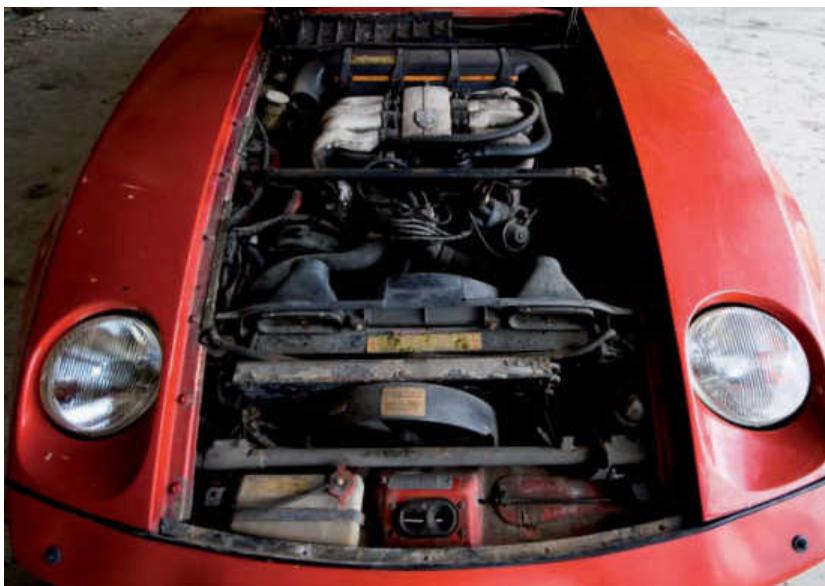
Looking a little worn around the edges, but this 928 is a significant piece of Porsche history. Pedro plans to restore it to its former glory for the 928's 40th anniversary before March 2017

appeared beside a 928 in the entrance of our hotel (Le Mas D'Artigny), and the presence of the new car overwhelmed the narrow, rather tall, elder machine and made it seem almost quaint and antique.' The *Car and Driver* scribes' more eccentric colleague, LJK Setright, was reminded of an even earlier precedent from the 1950s: 'The more I examine the 928 specifications, the more I see the car as a commercial version of the jewel-encrusted Pegaso Z103 that preceded it by 20 years. We must remember the firm's reason, after years of building low-polar-moment cars in the tradition of the GP Auto Union P-Wagen, for suddenly turning out a high-polar moment job in the idiom of that

racer's rival, the GP Mercedes-Benz: they have done so because they cannot find 15,000 customers named Bernd Rosemeyer! In other words, it is better for Porsche to perform a volte face in the showroom than for a customer to do one on the road.' Indeed, they did think at the time that the writing was on the wall for the 911, despite the fact that 911-derived 934s, 935s and 936s held the World Championship for Makes in a stranglehold. 'The 928 is not just the Car of the Year,' said Dr Fuhrmann; 'it's a car for the '80s. We think it's the car of the future. The 911 is the end product of 20 years' development; the 928 is only the beginning of a new era.'

Serious stuff. Here's Davis again: 'Every ten years, some car comes along that forces the automotive community to re-examine all of its preconceptions and conventional wisdom. The 928 is exactly that kind of automotive phenomenon. It will blow your mind, knock your socks off, toss your hat in the creek. The 928 is an almost poetic reaffirmation of Porsche's bedrock understanding and appreciation of the fundamental automotive verities. It is a sensational car.'

Since it was North America that Porsche looked to for maximum sales potential, here's another take from a contemporary press report. Writing in *Road & Track*, June



1977, Joe Rusz said: 'With the unveiling of the 928, Porsche suddenly plunges into the 21st century and quickly turns its back on nearly 30 years of tradition that began with Dr Ferdinand Porsche's rear-engined, air cooled autos of the '30s. Purists may still consider these to be the only true Porsches, but they had better restructure their thinking, because from now on, the 928 will be the standard by which all future GT automobiles are judged.' Rusz also went overboard on the driving experience: 'Pulling smartly away quickly dispelled any suggestions that this was a German Corvette. With the speedometer hovering at 130kph (80mph) it was the relative absence of mechanical and wind noise that made driving the 928 a startling experience. In the past I had always considered the Turbo Carrera to be exemplary in this respect, but the 928 changed all that. Here was a car that was not only quiet but even more civilised than the Turbo. Because of its 50/50 weight distribution the 928 exhibited a neutral attitude that its predecessors seldom achieved. The handling was like that of a finely balanced racing car – responsive, flat, positive. The ride is supple

and well controlled. But at all times it was the driver, not the car that made the decisions...the epitome of a marriage between man and machine.' Job done!

Porsche built around twenty pre-production 928 models for the press presentation in the south of France in February '77, from which they'd select a couple of cars for the world premiere at the Geneva Salon on March 17th 1977. Pedro's car, chassis 928 810 0030, was the one chosen to be on display most prominently at the Salon. It has white teledial wheels and white engine intakes, contrary to the production cars that were silver in these aspects. The interior is predominantly upholstered in white leather – even the roof lining – with Pasha inserts dominating the seats. The show car's window frames are trimmed with stainless steel and not matt black like the production cars, and the sill covers are plain plastic without the 928 numbering. There is no rear fog light, and no side indicators that all the 928s had from '79 on, and almost all '78s have had retro-fitted. For the rest, it's almost like a normal L-series 1978 model year 928.

After the Geneva Salon it returned to the

factory where it had a new interior fitted by special request. The author of the "special request" was allegedly Ferry Porsche himself. Ferry's previous 356 and 901 were finished in red, and there are three photos, one with the 356, one with the 901 and one with the 928, with Ferry always in the same pose, sitting on the bonnet. This customisation included the fitting of special electric Recaro seats, while the white leather of the dashboard was stained black. Still in the factory's Sonderwunsch special wishes department, four apertures were made – two in the dash and two in the door cards – for incorporating stereo speakers for the sound system. And here it remained until 1979 when it was finally sold to a customer from Prague, who had businesses in Switzerland. Then in 1981 the Czech owner sold it to a Portuguese business partner in Switzerland, who used the 928 for trips between Portugal and Switzerland. The last trans-continental trip between Switzerland and Portugal that the 928 made was in the mid-1990s, and after that it was locked away in a garage for about 20 years until the end of 2014. By now it had logged 125,000kms, or about 78,000 miles. Here's where Pedro

Despite being a sizeable V8, the 4.5-litre unit looks positively tiny in the 928's long engine bay. This ex-Geneva show car still sports its white plenum and intake pipes

There is a certain purity to the shape of early 928s, devoid of front and rear spoilers and even the side rubbing strips. Ride height is almost comical, accentuated by skinny wheels and tyres





Porsche's car of the future then and – to a certain extent – even now. It was certainly a serious advance over the 911, even if it failed to outlive the rear-engined, air-cooled machine

Diogo comes in.

Owning five 928s, Pedro is often on the lookout for spares, and one day he followed up an ad posted by someone offering a 1979 car for parts. 'When I first saw it I couldn't believe it! How the hell did the "Geneva 928" end up in Portugal?' exclaims Pedro. 'I had found the actual Geneva show car via this private offer for a 1979 928 – for parts! That year, 1979, was when the first invoice for the car was dated, but the seller didn't know anything more about it.' Needless to say, Pedro quickly bagged the car for himself, and it currently sits alongside another 1977–'78 model and another four 928s that he describes as 'not so special'. Like any committed Porsche buff, he began researching its provenance. First port of call was Porsche Ibérica, who told him no more than he already knew, and when he asked about Ferry's relationship with the car they blanked out. Meanwhile, a project awaits. The paint is peeling badly on the bonnet and passenger door, and the leather is cracked and in need of a feed. 'The driving position is too high for me because of the special Recaros commissioned by Ferry Porsche,' he muses. Pedro is a big guy, and he's right; they are cool seats in a retro fashion, but I have the same feeling, too, and I imagine if they were re-installed on their original runners they'd be fine. The alloy engine looks a bit corroded, and although it is a runner he won't

drive it again until it's had a major service. In fact, the engine is good, still with the white intakes, and all the powertrain is matching numbers. It's a manual shift with the dogleg first gear. We run the engine briefly, but nothing more for now. It sounds great, but then the exhaust is completely shot. The brakes and clutch are still working, but again, they really need replacing because the car has been stored for 20 years. 'On a trip I don't believe it would drive differently from any early 928. But right now I don't know if the brakes would function reliably, and in any case all the

even the original equipment Pirelli P7s, which are no longer available. But I still need more information from the factory, regardless of the Ferry ownership. It would be great to see this particular 928 in the museum at Zuffenhausen for that anniversary. I would even lend it to them for free! Indeed, we'd love a go ourselves when it's properly up and running.

Sure, hindsight tells us the 928 didn't outlive the 911. But when it was phased out in 1995 the air-cooled 911 had reached the end of the line, too. I fired up the 996 for the return journey back to Blighty, over the Trás-os-

“ My target is to restore it before March 2017 for the 40th anniversary ”

fluids need changing.' But Pedro has plans. 'The car is still exactly as I found it, and my target is to restore it to its former glory before March 2017 for the 40th anniversary of the 928's world premiere back in '77! My major doubt is whether to put it through a total restoration, or just give it a decent paint job, leaving all the other stuff with the patina intact. I need to think carefully about that, from the aspect of originality. The wheels also have the original white paint, and the rear tyres are

Montes uplands via Puebla de Sanabria, pounding the magnificent autopista or autovía (depending on whether it has a toll or not), and up to the craggy Asturian coast at Llanes for a welcome cider. It's a journey I've done several times in my "classic" 3.2 Carrera and 964, but – heresy alert – by comparison, the 996 is a peerless trans-continental grand tourer. Way better even than the 928. Even with those wonderful Pasha trimmed seats from jazzy Geneva! PW

Check that out! Full Pasha trim combined with white leather on chunky electrically adjustable Recaros. Looks to be in quite good condition, too

CONTACT
Thanks to Pedro Diogo for presenting his Geneva 928, and Brittany Ferries for the blissful Bay-of-Biscay crossing, Plymouth – Santander. To book: brittany-ferries.co.uk



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REASONS TO BE CHEERFUL

It is nearly 20 years since the arrival of Porsche's first water-cooled flat-sixes, and more than three since we last looked at the many ways in which they go wrong. In the first of two in-depth stories Chris Horton analyses the current thinking on aspects of this massive and ever-growing subject, but at the same time offers some much-needed hope for the future. Photographs by the author



It was in our October 2012 edition that we last ran a major story on Porsche's M96 and M97 engines. That nine-page feature was prompted by even then an infamously patchy reputation for reliability and longevity in what was – and in our view remains – an ingenious and elegant solution to the problem of building a lightweight, powerful, environmentally acceptable and not least commercially viable flat-six for the 21st century. *Survival of the fittest*, we called it, and our conclusion was that, despite what appeared to be the ever-present possibility of a significant blow-up, it didn't have to end in tears.

Three years on, not a great deal seems to have changed. Internet forums remain packed with stories of tragically premature failures, such as that reported directly to us by Belgium-based reader Alun Morris a few weeks ago (see page 105 in this month's how-to story). And almost every one of the many reputable independent specialists that we routinely visit usually has at least one rebuild on the go, and in some cases two, three or even four. Lancashire-based Harteck – which has deservedly become the go-to supplier for many retail and trade customers alike – has turned the repair, remanufacture and upgrading of M96 and M97 engines into a veritable production-line process.

But then along comes Norwegian reader Nils Christian Nesthorpe, whose 986-model Boxster 2.5 has reached 180,000 miles on what would seem to be its original power unit. And only a couple of years ago this writer reported on a Boxster – co-incidentally (or perhaps not) another 2.5 – that had covered 194,000 miles, and was still going strong. We have no idea if that car is running today, of course, but would certainly be willing to bet that it is out there somewhere. There are, indeed, two sides to every story; a silver lining in every dark cloud.

So what is going on? Are we – as some critics still suggest – scaremongering? (Emphatically no! Talk to any of those independents – and especially Harteck. Look at the forums.) Or is it the case that the truth hurts? Our own view is that nobody really knows how many of these engines have failed in some way or other, often to the point of self-destruction – but it has to be a proportionally significant number, even allowing for the many hundreds of thousands of units that have been built over the last two decades. (And we do accept that you rarely hear good news.) Someone, somewhere within Porsche itself must have an idea, of course, but apart from having quietly modified certain aspects of the units, both during and after their production life – and redesigning later generations to eliminate



Dark-blue Boxster 2.5 (top) had done over 194,000 miles – apparently on the same engine – when we featured it in autumn 2013. Do you now own it? Is it still running as well as it was then? Please let us know! Norwegian car – co-incidentally another 2.5; above – has in the last few weeks reached the equivalent of around 180,000 miles. You have to feel for Alun Morris, though, whose 911 Carrera 4S (above right) has by the sound of it recently destroyed its IMS bearing.

See also pages 102–105 in this issue for a how-to story on the same problem in an exactly similar car – albeit without any obvious engine damage. Hopefully Alun will be lucky.

Heading photo on opposite page shows a smiling Paul Hughes of Hertech with 911&PW art editor

Peter Simpson's then newly rebuilt 1999 C4 engine back in 2011.

Clearly a man who enjoys his work... Our thanks also to Barry Hart for his valued input on this feature, as well as Matt Wiltshire at Autofarm

these Achilles' heels; witness the iron-coated cylinder bores of the latest 991 motors – the company is still playing its cards predictably close to its chest. Problem? What problem?

Perhaps, however, we should more accurately suggest that probably few – again outside Zuffenhausen, that is, and even those within it may not – know definitely and precisely what is causing some of these failures, however numerous or infrequent they might be. What is becoming clearer, even anecdotally, is that the problems that do occur – by and large, and depending upon the precise age, type and not least capacity

of the engine concerned – seem to have become focused around the intermediate shaft (or IMS) bearing, and/or the cylinder bores and/or pistons. Certainly those are not only the most important bits but also – unsurprisingly and distressingly – by far the most difficult and expensive to deal with.

That is not to suggest that your M96 or M97 will never suffer from lesser issues with cracked cylinder heads, valve and guide wear, hydraulic tappet maladies and assorted oil leaks (all of which, to be entirely fair, can and do afflict many other manufacturers' engines); or from problems with ancillaries

TERMS OF ENDEARMENT?

Clarity is always absolutely vital in any technical discussion, we think, and this one is no exception. Some basic precepts, then; ground rules and conventions, if you prefer.

Both the 996 and 997 Carreras, and the 986 and 987 Boxsters and Cayman, share the same basic 'genus' of M96 and M97 engines. Broadly speaking, the switch from the former type to the latter occurred during the mid-2000s, effectively giving all 996s an M96, and all 997s an M97 – although confusingly and somewhat counter-intuitively the then recently updated 987 Boxster and new Cayman didn't get the M97 proper until the 2007 model year. For more on this see the question and answer on page 124 of the December 2015 issue, which also offers a few words of explanation about the many engine-type suffixes.

In the rear-engined 911 the power unit is mounted behind the transmission, with the flywheel and the clutch (or the torque converter in Tiptronic cars) facing forward. In the mid-engined Boxster and Cayman the flywheel or torque converter faces to the rear. This has an obvious effect on the cylinder-numbering sequence, which always starts from what in the 911 is the left-hand rear corner of the engine. Thus cylinders one, two and three are here within the left-hand cylinder bank, and numbers four, five and the frequently

troublesome six in the right-hand bank. Unsurprisingly, then, both the Boxster and the Cayman have cylinders one, two and three in the right-hand cylinder bank (with number one toward the front of the car), and four, five and six in the left-hand bank – and thus six at the rear. In all cases the firing order is the same as it has always been for Porsche flat-sixes: 1-6-2-4-3-5. The crankshaft in both cars rotates anti-clockwise, as viewed from the flywheel end of the engine, with the internal layout of the final drive providing the necessary forward and backward motion as required.

This reversal of the engine's orientation within the chassis also has an effect on the layout of the exhaust system. One of the results of the bore-scoring that, in the 997 especially, so often affects cylinder number six (more on this massive area next month) is increased oil consumption, but because – in the 911 – the exhaust pipes leading from the two cylinder banks effectively cross each other, it is usually the left-hand tailpipe that will show the most obvious signs of smoke and/or a build-up of soot. Both the Boxster and the Cayman have either one or two more or less conjoined tailpipes leading from the middle of the single main silencer, so here the result of any increased oil consumption will be less obvious.

Consider yourself fortunate if you own

ranging from the VarioCam mechanism through the air/oil separator to the ignition coil packs. And all of those items can present symptoms that might wrongly lead some unduly pessimistic owners – or unscrupulous specialists – to suggest that an affected motor is toast when, in fact, it could be relatively easily repairable. We recall, for instance, a colleague's then recently acquired and heavily smoking 987 Boxster 2.7, all set to undergo an engine change until someone had the wit to replace the crankcase breather. Problem solved.

But therein, we suggest, lies the ray of hope; the proverbial silver bullet. Modern technology being as sophisticated as it is, the engine of a water-cooled flat-six Porsche should, like those of many mainstream and admittedly less highly strung vehicles, be capable of 250,000 miles or more with only fairly basic – but regular – maintenance. (This writer's 1987 BMW 525e is fast approaching that figure, and still has its original pistons, cylinder bores and crankshaft bearings.) If, however, by dint of its design it may not be, then at least there is both the now nearly 20 years' worth of accrued after-market knowledge to help you maximise its likely lifespan, and the expertise and not least the again usually after-market hardware to help you get it running again – and then to keep it running.

Even that, sadly, will cost you quite a lot of money, which by rights ought never to be necessary in this high-tech day and age, but have the work done selectively, carefully and diligently, and you should end up with a machine that could either outlast you, or – if every previous Porsche 911 is a reliable guide, anyway – will soon start to go up in value again at a rate more than sufficient to justify the investment. And that, surely, is the main reason why few people ever complain about the frankly eye-watering price – sometimes as much as £15–20K for a proper job – to rebuild an air-cooled 911 engine, often after as few as 50,000 miles. Such, dare one suggest it, is the selective blindness of the hopelessly besotted. And long live liquid-cooled flat-sixes, we say.

either a Turbo model of the 996 or the 997, including the GT2, or a GT3 derivative. (Well, you would, wouldn't you?) All of these cars have an engine with a bottom end derived from that of the old air-cooled 964/993-style motor, and as a result suffer from neither the intermediate-shaft problems that have become arguably the M96's major Achilles' heel (if not the M97's) nor, despite their water-cooled cylinder blocks, any major bore-scoring issues. That is not to say that they never go wrong, but more often than not that will be down to persistently hard circuit use and/or poor maintenance, and under those circumstances any engine is going to need more frequent internal inspection and overhaul.

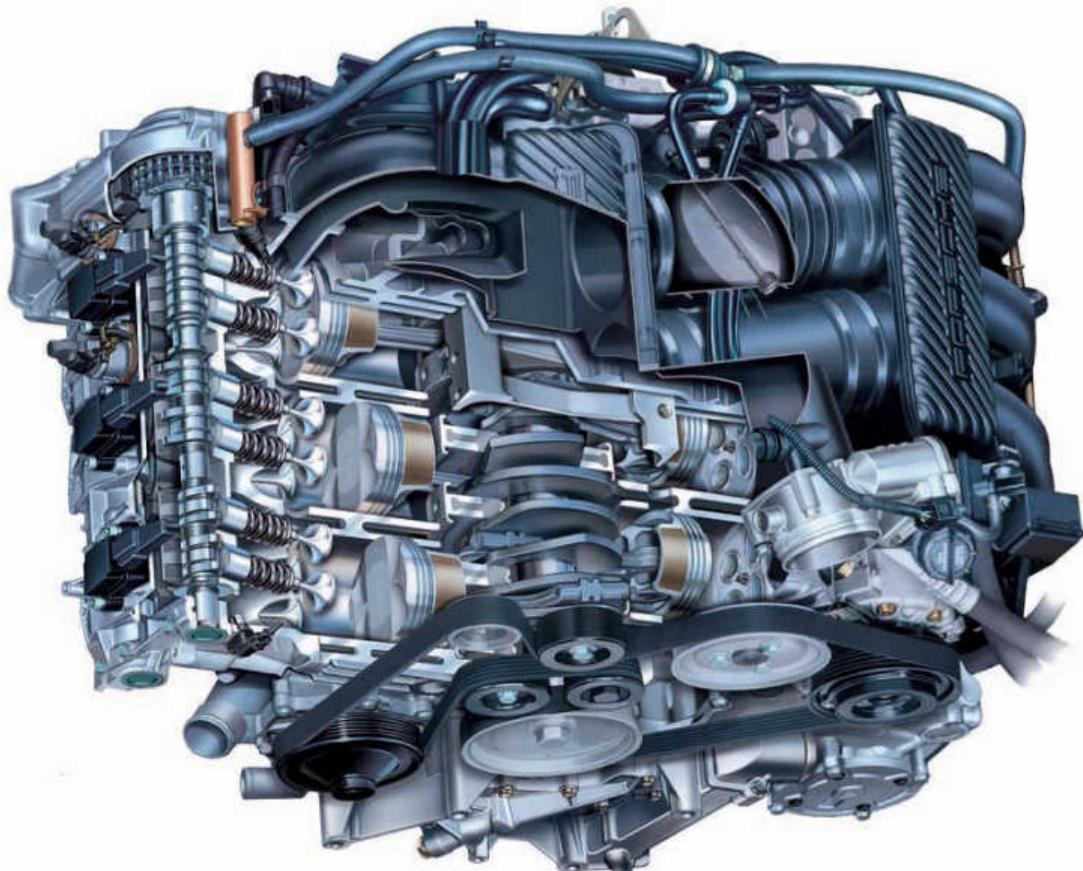
Notably the so-called Generation 2 M97 engine – fitted to the 997 Carrera and the 987 Boxster/Cayman from the 2009 model year – has a not dissimilar layout that likewise eliminates that problematic intermediate shaft. And the twin-turbo Generation 2 991 engines, introduced this autumn for the 2016 model year (see pages 44–51 in the November 2015 issue), have been given iron-coated cylinders, supposedly to reduce friction and thereby help to improve fuel consumption. Also finally to eradicate bore-scoring, perhaps? You will doubtless have your own ideas about that. But we couldn't possibly comment.

THE INSIDE STORY

Even by the early 1990s it was becoming clear to Porsche that the then 25-year-old air-cooled 911 engine was painfully long in the tooth. It was hugely expensive to build, never particularly fuel-efficient, even with a modern electronic management system, and above all inherently far too noisy not to be outlawed by forthcoming environmental legislation. And in that context, at least, the M96 and later the M97 are, we firmly believe, little short of genius.

Certainly it requires a number of rather specialised tools to assemble them – including a means of reliably fitting the gudgeon pins and their retaining circlips to the three pistons in the right-hand cylinder bank (the left-hand bank in the Boxster) – but gone are the days of laboriously checking that all six individual barrels of the air-cooled engine are set at precisely the same height. And stripping an M96/M97 to its component parts can be done with little more than a few spanners, sockets and ordinary screwdrivers. We know because we have done it.

At the engine's heart was – is – a compact, short-stroke crankshaft (for smoothness at high revs), running in seven conventional shell-type, pressure-fed bearings sandwiched between the two bolt-together halves of a special steel and cast-



WHAT CAME WHEN: CAPACITIES, UPGRADES, AND OTHER VITAL STATISTICS

Creating an easily understood overview of the M96's and M97's evolution is no easy task, not least because often when Porsche introduced an upgrade there sometimes followed a period during which it seems to have used mixed batches of both old and new components. Even so, the following should give you a reasonably comprehensive – and contextually relevant – idea of what features came when.

Note that all of this information refers only to the M96 and then to the first-generation M97 engines, production of which ceased to make way for the substantially different Gen 2 M97 units (2.9 and 3.4 litres for the Boxster and Cayman, 3.6 and 3.8 litres for the 911 Carrera) in mid-2008 for the beginning of the 2009 model year. Also excluded here are the again always significantly different Turbo/GT2 and GT3 variants.

Despite the broad similarities between all of these mainstream engines, only a few are suitable for the capacity upgrades that were traditionally such a simple and relatively cheap route to improved performance. And even then we would today question the genuine benefit of any such exercise relative to its cost (and the power boost likely to be achieved), even if carried out at the same time as a full rebuild.

Note, too, that in August 2000 Porsche issued a service bulletin advising the retrospective replacement, where appropriate, of the early-style roller-type primary chain with the subsequent 'Hy-Vo' system – even though it required replacing not only the intermediate shaft but also the crankshaft. The same modification was implemented for factory assembly at around the same time. It is entirely possible, then, to come across an engine that by rights should have the early double-row IMS bearing, but now has the later single-row type and associated components.

2.5 – 248cc; 986 Boxster

The first iteration of the M96 appeared in the then brand-new Boxster in 1996, for the 1997 model year. Capacity was 248cc, output 204bhp. It was replaced in August 1999 – for the 2000 model year – by the M96 2.7 (see below). All of these engines have a roller-type primary chain, four further camshaft chains (making them so-called five-chain engines), and a double-row 'small' IMS bearing. (That

refers to its diameter, not its depth) The 2.5 was used in no other Porsche model, and is in that sense something of an evolutionary dead end. Perhaps not surprisingly, given its modest cylinder capacity and power output (albeit still a respectable 82bhp/litre), it has proved itself to be one of the more reliable units

2.7 – 2656cc; 986 & 987 Boxster, and 987 Cayman

Introduced in August 1999 for the 2000 model year, the M96 2.7 had a capacity of 2656cc. Output was 217bhp, then for the following two model years 220bhp. Power was further increased in August 2002, for the 2003 and 2004 model years, to 228bhp. There is a roller-type primary chain and a double-row small-diameter IMS bearing to 2001, and a Hy-Vo primary chain and single-row small-diameter IMS bearing thereafter. Production continued – as an M96 unit – for the entry-level 987-model Boxster through the 2005 and 2006 model years (both producing 239bhp), and then for 2007 and 2008 it was replaced by an updated and upgraded M97 version with the same capacity, but now developing 245bhp. This engine, with the same power output, also appeared as an M97 unit in the entry-level Cayman, but was later replaced by the Gen(eration) 2 2.9

3.2 – 3179cc; 986 & 987 Boxster 'S'

Introduced in August 1999 for the 2000 model year, and for the Boxster 'S' only, came the M96 3.2 – actually 3179cc. Output was 252bhp, and from August 2002 (ie for the 2003 model year) 260bhp. It has a roller-type primary chain and double-row small-diameter IMS bearing to 2001, and a Hy-Vo primary chain and single-row small-diameter IMS bearing thereafter. Production continued, as an M96, for the 987-model Boxster 'S', launched in 2004 for the 2005 model year, but ceased at the end of the 2006 season, when the engine was effectively replaced by another M97 3.4 (see below), itself later replaced by a Generation 2 3.4. Can be upgraded to 3.7 litres with the relevant pistons and cylinder boring (more on that next month)

3.4 – 3387cc; 996 Carrera

The first appearance of the M96 3.4 was in

autumn 1997, for the 1998 model year, in the 996-model 911 Carrera. Capacity was 3387cc, output 300bhp (320bhp with the X51 power upgrade). It was replaced in autumn 2001, for the facelifted 2002-model cars, by the M96 3.6 (see below). It has a roller-type primary chain and double-row small-diameter IMS bearing to 2001, and a Hy-Vo primary chain and single-row small-diameter IMS bearing thereafter. An M97 of the same capacity but with 'only' 295bhp later appeared in the 987-model Boxster 'S' and Cayman 'S' for the 2007 and 2008 model years. All of those have VarioCam Plus, the Hy-Vo primary chain and larger-diameter IMS bearing, as well as new (but arguably not dramatically improved) cylinder-head gaskets. Can be upgraded to 3.7 litres with the relevant pistons and cylinder boring

3.6 – 3596cc; 996 & 997 Carrera

Introduced in 2001 for the 2002-model 911 – the so-called facelifted cars – the M96 3.6, with VarioCam Plus variable valve timing and lift, had 3596cc and 320bhp (350bhp with the X51 kit). All have the Hy-Vo primary chain and later-type cylinder-head gaskets, plus a mixture of the single-row small-diameter IMS bearing to 2004/2005, and thereafter the then new larger-diameter IMS bearing (which requires the engine to be stripped for removal and replacement). The 996 was phased out during 2004, but production of essentially the same engine (now with 325bhp, and now type-numbered M97) continued for the base-model 997 until the launch of the Gen 2 cars for 2009. Can be upgraded to as much as 3.9 litres with the relevant pistons and cylinder boring

3.8 – 3824cc; 997 Carrera 'S' only

Introduced in 2004, as an M97 unit, for the then new 997-model 911 Carrera 'S'. Capacity 3824cc, output 355bhp (or 380bhp with the X51 power upgrade kit). All have a Hy-Vo primary chain, but a mixture of first the smaller- and then the larger-diameter IMS bearing (the only reliable way to tell is to separate the engine and gearbox, and physically examine the bearing's securing nut, ie 13mm or 22mm), plus the new cylinder-head gaskets. It remained in production, more or less unchanged, until replaced by the Generation 2 versions for 2009

Whatever your view of Porsche's water-cooled flat-sixes (above), the simple truth is that the company could not have continued to rely on air-cooling. Even 20 years ago it was partly an environmental issue of exhaust emissions and not least mechanical noise, but the old 'Mezger' motor cost a fortune to build, too. Without the cheaply mass-produced M96 and its successor, the M97, Porsche would almost certainly have continued to lose so much money that its very existence today would have been questionable. And the water-cooled motors are undeniably ingenious: compact, powerful, light and efficient, and with some remarkably clever features – VarioCam Plus variable valve timing, for instance. Others are, of course, pretty dumb – so-called 'cracked' big-end eyes in the con-rods, for example – but the good news is that the ever-resourceful after-market has already engineered some pretty effective workarounds. We shall be featuring a big buyers' guide to those next month

EPS engineers & manufactures corrections.



IMS BEARING UPGRADE

Fits Porsche 996, 997, Boxster and Cayman vehicles

- Permanent fix or prevent intermediate shaft failures
- Uses patented cylindrical bearing with thrust control
- Comes with a modification for forced engine oil feed



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alloy carrier. End-thrust from the clutch is carried by separate, crescent-shaped washers either side of the designated journal. So far, so conventional.

That sub-assembly, in turn, is placed between the two halves of a combined crankcase/cylinder block made from a lightweight aluminium-based alloy, with integrally cast light-alloy cylinders (or 'pre-forms' as they are known) impregnated with a resin- and silicon-based material known as Lokasil to enable them to withstand the abrasive action of the necessarily harder cast-iron piston rings.*

The light-alloy and specially coated pistons (cast in early engines, later forged) are of the cutaway-skirt design to reduce frictional

hydraulic tensioner per cylinder bank, bearing against a nylon guide plate inside the chaincase. The tensioners, but not the chain guides, can be removed from outside.

The assembled crankcase has beneath it a cavity – a sump – closed off at the bottom by a light-alloy plate. Inside this 'wet' sump is both the engine's reservoir of lubricating oil – the air-cooled flat-six was, by comparison, a dry-sump unit, with the oil in a separate tank – and the intake to the oil pump itself.

Because the engine doesn't have a reserve oil tank (to help keep the pump intake adequately supplied with lubricant through fast corners, when the residual oil is being centrifuged towards the outermost areas of the cylinder heads), it could

underside of the short chain linking the exhaust camshaft – which is itself driven by the long chain from the intermediate shaft – with the inlet camshaft. This process effectively shortens the chain, and thereby advances the opening of the inlet valves relative to the exhausts for optimum low-speed torque and overall fuel-efficiency.

In later engines, however, these two chains per cylinder bank – a system reminiscent of the 16-valve 944S2 and 968 – are replaced by a single long chain looped around both sprockets. Here the variation in timing is achieved by means of an oil-pressure-activated adjustment between the centre part of the exhaust-camshaft sprocket and its teeth. Unsurprisingly these engines are also known as three-chain units.

Note, though, that the 3.6- and 3.8-litre naturally aspirated engines, together with the Turbo and GT2, have a system known as VarioCam Plus, which no less cleverly offers both variable valve timing (via that later rotary-adjustment system) and, by means of special cams and stepped followers, variable valve lift, as well. In all engines those cam followers (also widely known as tappets) are pressure-fed, and thus automatically self-adjust to maintain the required operating clearances under all conditions.

Both the Turbo/GT2 and the naturally aspirated GT3 have a crankcase very closely derived from that of the air-cooled 964/993, and while not immune to piston and/or cylinder problems, seem to have nothing like the same intermediate-shaft issues as the mainstream M96 and M97. An additional variation of this older-style crankcase layout was also used for the so-called Generation 2 M97 engines, introduced for 2009 in the then current 997 range, and now used, in still further modified form, in the 991.

The cooling system is based around an externally mounted pump at the rear of the engine in the 911, and obviously at the front in the Boxster/Cayman. Drive is via a serpentine, multi-rib belt from the crankshaft, which also powers the alternator, the steering pump, and the air-conditioning compressor. The starter motor is mounted above the cylinder block, beneath the inlet manifold, its drive gear engaging with the ring gear on the flywheel or the torque converter. Each of the six spark plugs is fired by its own individual ignition coil, so there is no old-style distributor to worry about.

* Porsche has always favoured various aluminium-based alloys for cylinder construction. These are both light and strong, but under normal circumstances would be worn away by the harder cast-iron piston rings. In the 944 and 968 this was avoided by adding varying amounts of nickel and/or silicon to the 'mix' in order to increase its abrasion resistance, but this was itself both wasteful and quite expensive, and tended to increase machining time. For the M96, then, the company came up with the idea of 'pre-forms': relatively thin-walled individual cylinders, impregnated with a mixture of silicon and a special resin. These were placed inside special die-casting moulds for the cylinder blocks, which were then injected with molten alloy under high pressure, first to burn out the resin, and then to fill the now vacant tiny spaces in the pre-forms. It was as clever as it sounds, but does mean that even a slightly scored or otherwise damaged cylinder cannot easily be reclaimed by reboring in the conventional sense – although we understand that Autofarm, or more correctly its machining partner, can now replate bores that have only minor scratches, before honing them back to the correct size. More on this – and other aspects of the cylinder block and pistons – next time

“The shaft is supported at the flywheel end by a special ball bearing”

losses, with shallow recesses in their crowns for the four valve heads per cylinder, and the connecting-rods, with so-called 'broken' big ends for accuracy of fit (and cheapness again), are made from high-strength steel – although some experts argue that they could usefully be stronger still. Big-end bearings are of the conventional shell type.

Beneath the crankshaft is the now infamous intermediate shaft. Driven by a short chain from the flywheel end of the crank, its main purpose is to operate the two overhead camshafts per cylinder bank, and also the oil pump. Early engines have a double-row, roller-type primary chain, but this was later replaced by a so-called Hy-Vo item made by BorgWarner, with internal teeth to mate with the straight-cut, gear-type sprockets on the crankshaft and intermediate shaft. This was supposedly done to make the engine quieter, and some earlier units will have been converted in service.

The intermediate shaft is supported at the flywheel end of the engine by a special ball bearing, and at the opposite end by a plain aluminium bore inside the housing for the gear-type oil pump, which it also drives via a short, hexagonal-section steel shaft. The camshaft chains – all double-row, roller-type items – have a spring-loaded and oil-fed

conceivably run 'dry' for short but obviously disastrous periods. To help avoid this, a scavenge pump on each cylinder head pumps back to the sump any oil that accumulates within them.

Each scavenge pump is driven by a peg that engages with a slot in one end of the relevant exhaust camshaft. The standard sump plate features baffling as an additional safeguard against oil being flung away from the pump intake by centrifugal force, but various deep-sump kits are available. These generally have improved baffling, and also offer a small increase in oil capacity, but they do reduce the engine's ground clearance. The 997 also has a pump at the rear of the right-hand cylinder head – also driven by the exhaust camshaft – to generate the partial vacuum required by the brake servo.

The two cylinder heads (both of which begin as more or less identical castings in order to reduce manufacturing costs) feature four valves per cylinder, and an ingenious variable-timing mechanism known as VarioCam. This works in one of two ways.

In earlier 'five-chain' engines each cylinder head has a solenoid-controlled valve that when activated by the engine management system allows pressurised oil to extend a piston and its nylon guide plate against the

Gear-type sprocket shows this IMS (near right) to be of the second of three types, with a single-row bearing; the earliest engines had a conventional toothed sprocket like a bicycle's (albeit with two rows of teeth rather than just one), plus a deeper rebate for a double-row bearing (which, not entirely surprisingly, seems to be more reliable than its successor). Either way, this bearing is comprehensively trashed, for reasons that are rarely entirely clear – although the shaft itself might just about be reusable, if the remains of the outer track can be removed without causing still further damage. Support flange in the foreground will have to be discarded.

Photo on the right shows the uprated later single-row bearing from LN Engineering: it has conventional steel tracks, but so-called ceramic balls. You'll buy a lot of standard off-the-shelf bearings for the same price, though, and labour costs for pre-emptive replacement shouldn't be too prohibitive, especially if you have other work carried out at the same time

Below, left to right: early-type IMS with toothed sprocket, and always with a double-row bearing, was superseded by a shaft with a gear-type sprocket and a single-row bearing. Porsche made this change to reduce engine noise, and these parts could have been fitted retrospectively – although since the matching crankshaft was required it was very expensive, and so likely to remain rare. Bottom row: later still – in around 2006 – came the same gear-type shaft, but now with a significantly larger bearing, which again seems reliable. Only drawback – whether for servicing, or for those who would update an earlier engine, is that the bigger bearing won't pass through the aperture in the crankcase (right), so a full stripdown is required to install it



IMS AND BEARING TYPES: A SPOTTER'S GUIDE

M96 and M97 engines come with potentially three different IMS-bearing set-ups. First there was the so-called double-row device, with a depth (or track width, if you prefer) of 24mm. By definition it appeared only in early 986 Boxsters and 996 Carreras, and so today is relatively rare – but also seemingly quite reliable.

It was used in conjunction with the earliest type of intermediate shaft, featuring a conventional toothed sprocket for the roller-type primary chain. The first bearing support flanges had a relatively thin 'O'-ring seal round their circumference, but after complaints about oil leaks this design was replaced by one with a somewhat thicker ribbed seal (see photo below left). The circumferential groove in the bearing's outer track was designed for a snap ring, which also locates in a similar groove in the rebate within the intermediate shaft itself.

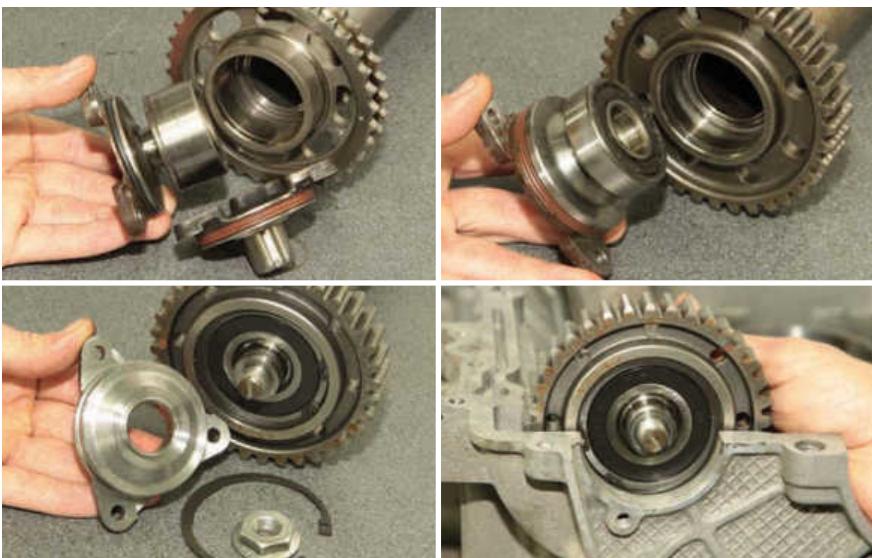
The bearing can be replaced by either a standard Porsche part or a proprietary item if you can source one (we couldn't find an exact match, although at the time of writing we are still trying), or else an upgrade from either LN Engineering or EPS. But any significant damage to the shaft itself will require an update to one with the later gear-type primary sprocket, designed to accept a so-called Hy-Vo chain – and that will necessitate both an engine strip and even the fitting of the relevant crankshaft. Forget it, basically. If it's that much of a problem, spend your time and money on a decent second-hand engine.

Next came an IMS with both that aforementioned gear-type sprocket and Hy-Vo chain (allegedly to make the engine quieter), and a now 14mm deep so-called single-row bearing. This was retained within its commensurately shallower rebate by an internal circlip (not shown in the photo below right, but see this month's how-to story on pages 98–101). Note both the plastic side covers on the bearing, designed to retain the necessarily small quantity of factory-packed grease, and here the tell-tale signs of that grease and/or the resulting swarf being washed out from behind them, seemingly by spurious engine oil.

Again both LN and EPS offer upgrades for these items, but your local bearing specialist should be able to supply an exact match for the Porsche part for £20 or less including VAT. It is a so-called standard bearing, used for a wide variety of industrial and other automotive applications.

The third and final iteration of the IMS bearing is unsurprisingly the most reliable – few, if any specialists report any of the earlier problems – but annoyingly also the most difficult to service. Its significantly larger diameter (whence, presumably, derives its reliability) makes it impossible to remove from the end of the shaft without first splitting the crankcases – see the bottom two photographs below. It would still be worth installing a new one if ever the opportunity arises, however, either from Porsche or a bearing supplier (it's another 'standard' item), or from LN Engineering or EPS, both of whom offer uprated equivalents.

Porsche made the switch to this much larger-diameter bearing in around 2006, but if you have an engine dating from around this period the only reliable way to check which one you have is to split the engine and transmission and have a look. Even then it is not immediately obvious – the supporting flanges are essentially the same – but the larger bearing can easily be identified by its 22mm securing nut. The smaller-diameter bearing has a 13mm nut.



A BEARING ON THE MATTER

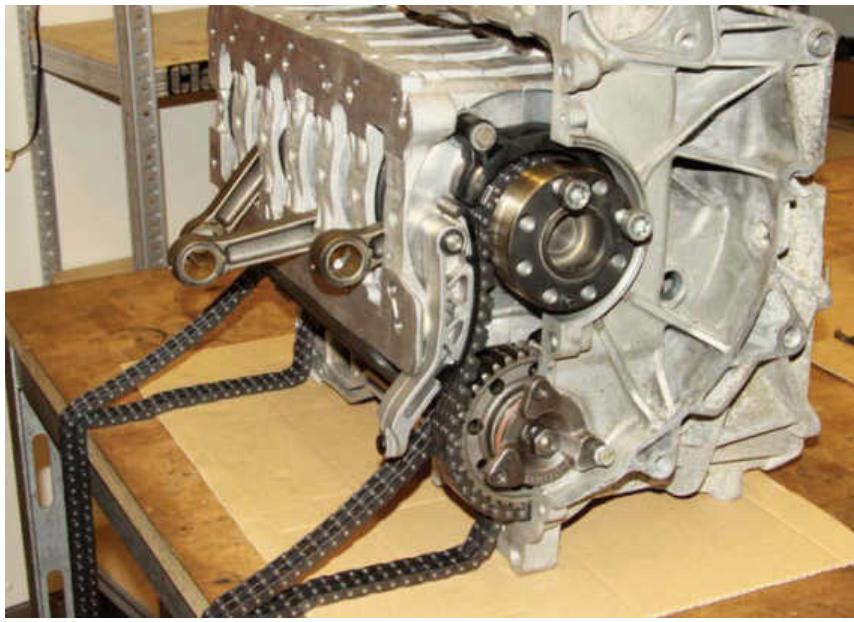
The M96/97's intermediate shaft, as we have seen, runs parallel to and immediately below the crankshaft, its purpose being to drive both the oil pump (which is situated at what might be termed the 'ancillaries' end of the engine) and, via the flywheel end, the valvegear. The oil pump generates little, if any, radial load, and so that part of the shaft happily runs in a plain, oil-fed bearing formed between the two crankcase halves. Such is the tension on the camshaft drive-chains, however (although you might imagine that the pull from one would cancel out that from the other), that here something a little more substantial was required, and so Porsche fitted a ball bearing 'race', much like those supporting your car's road wheels.

It might seem remarkable that something as simple as a single entirely run-of-the-mill ball bearing, of a type that has been around for at least 200 years, should be able to halt and in so many instances destroy an engine as sophisticated as this. Remarkable, too, perhaps, that Porsche should have placed so much faith in such a relatively small device to handle such an important task, but there you are – and the eventual adoption of a somewhat larger-diameter and anecdotally 100 per cent reliable unit probably tells its own story. (More on that in a moment.)

The layout of the IMS bearing can seem confusing, but is simple enough when you have seen it in the flesh, so to speak. (See the sidebar, left, for an explanation of the three different sub-types.) The outer track of the ball race is an interference fit within a rebate in the end of the intermediate shaft. Through the centre of its inner track passes a short threaded stud, effectively secured from inside the intermediate shaft by being part of a 'button' located against the back of the bearing's track. To this stud, via a locknut, is attached an external supporting flange, and that, in turn, is anchored to the aperture between the two crankcase halves by three M6 screws. Oil sealing is handled by two 'O'-rings – one around the circumference of the outer flange, another around the internal stud – and crucially by the so-called micro-encapsulation of the threaded area of the three securing screws.

So far, so good – and no doubt the designers' original calculations, followed by much testing long before the engine was signed off for production, suggested that this should be an entirely adequate arrangement. What seems to happen in service, however, is that for some reason the bearing wears excessively, often to the point that it breaks up completely. (It is tempting to think that you might hear any nascent problem long before it becomes a potential disaster, but in reality both the internal location of the bearing and the noise of the engine make that practically impossible.) This situation, unsurprisingly, allows the rear end of the intermediate shaft to 'float', often to the stage where one or other of the drive-chains will either jump one or more teeth, or perhaps even break. Either way, valves will very quickly meet pistons, and immediately it is game over.

That is almost certainly what has taken place within Alun Morris's 2003-model Carrera 4S engine (see this month's how-to story on pages 102–105) – although at the time of writing we have yet to confirm that



Partially assembled engine shows how the crankshaft is first mounted in a special carrier, itself then sandwiched between the crankcase halves.

Not all after-market components are up to scratch (right): chain on the left of the photo has a slightly incorrect pitch, which could cause big problems if fitted

Given the size and importance of this subject, we have divided our latest analysis of Porsche's M96 and M97 engines into two parts. Elsewhere in this first instalment you will have seen an overview of the power units' general layout, plus a timeline panel outlining capacities, production dates and

relevant internal modifications, and not least an in-depth examination of the often catastrophically troublesome IMS bearing. See also pages 102–105 for the story of the IMS-bearing failure that so very nearly ended in disaster, but which some rather clever spannerwork turned into little short of a triumph. Next month

we shall devote our attention to the similarly critical piston and cylinder-bore issues, plus the crankshaft and its bearings, and conclude with an invaluable buyers' guide to the many upgrades and other relevant products and systems available.

Don't miss it!

by stripping it – and it is beyond doubt what took place within the power unit featured as the primary element of that article (coincidentally from an almost identical 2003 Carrera 4S). Thanks to some near-miracle that particular engine continued to run after the bearing had failed, however, with no damage to the valves or pistons, and the owner escaped with a bill for around £2000.

Why the bearing so often collapses is less easy to say. Excessive load and/or a lack of lubrication are usually the most likely reasons for any such component to fail, but we can almost certainly rule out the former. Likewise

slightly larger than the hole between the crankcase halves.) All three come with all of the necessary ancillary parts, such as the new outer support flange, seals and screws, and with prices starting at US\$799.00. LN also offers a kit of the special tools required to remove the standard bearing and install these so-called Retrofit devices (US\$350.00), and chain-tensioner 'paddles' machined from solid aluminium. (The Porsche parts are faced with softer nylon.) Full details at www.lnengineering.com.

EPS takes a broadly similar but in detail somewhat different approach. 'The design

you would buy a later-style intermediate shaft, complete with the gear-type sprocket and larger bearing (currently £830 plus VAT), but obviously this would require not only a full engine strip but also a replacement crankshaft. And so it goes on.

The good news, however, is that your local bearing supplier should be able to supply the single-row small-diameter bearing for as little as £15 (it's a size widely used in industry), and while it might take a little more searching to find an equivalent for the larger-diameter device those should be obtainable, too – and the fact is that they rarely go wrong in the first place. Neither a new Porsche bearing nor the standard-style after-market bearing is in principle any better than the one you will have removed, of course, but they can be no less good, and given correct maintenance (more on that next month, as well) will surely last more than long enough to justify the cost of pre-emptive replacement at, say, 48,000 miles – or perhaps even half that distance if you really want to be safe. And the fact is that the considerable cost saving against an uprated after-market bearing will go a long way toward the cost of splitting the engine and transmission, especially if you have other work done at the same time – a clutch and/or crankshaft-seal replacement, perhaps.

Hartech (www.hartech.org), today probably one of the best-known and certainly one of the busiest M96/97 engine specialists – in mid-November it had nearly 30 engines on its Bolton, Lancashire, premises for work of some sort or another – prefers in this context to keep its rebuilt engines as close to standard as possible, too. (We shall look at its cylinder/piston solutions next time.) It is not a proponent of any kind of in-situ bearing replacement where it can be avoided – 'It puts too much stress on the shaft, and possibly the crankcases,' argues managing director Grant Pritchard – but also recommends that, wherever possible, the later, post-2006 intermediate shaft and its substantially larger bearing are installed.

This, as we have noted, requires a full engine strip (and obviously you couldn't subsequently change the bearing alone, should that ever be necessary, without yet another complete stripdown), but then the vast majority of Hartech's work is in those full rebuilds, and in any case failures of this

“Thanks to some near-miracle that engine had continued to run”

excessive speed: the IMS bearing rotates at two-thirds engine revs, so generally at comfortably less than 5000rpm. (And as we have said, the later-type and substantially larger-diameter IMS set-up does seem entirely reliable.) But here's the thing: as specified by Porsche the bearing is factory-packed with grease, designed to be retained by the two plastic shields between each inner and outer track. There can only ever be a small quantity of that grease between the balls and the tracks, however, and no possibility of replenishing it. Factor in what is now thought to be the flushing effect of spurious engine oil gradually finding its way along the intermediate shaft and, well, you can see where this is heading, can't you?

What to do about it? There are, famously, a number of after-market solutions, most notably from LN Engineering and EPS, both based in the United States but selling worldwide thanks to UK-based distributors and, of course, the internet.

The former company offers three so-called ceramic-hybrid ball bearings to replace not just the double- and single-row small-diameter Porsche items (which can be done without stripping the engine), but also the later larger-diameter unit – although that, as we have said, requires the engine to be disassembled completely. (The bearing is

flaw with the factory IMS,' it argues on its website, although we suspect Porsche might take issue with this, 'was the use of ball bearings in an extremely high load application. Once the ball bearings fail it leads to a catastrophic and expensive engine rebuild. We have developed an IMS bearing with cylindrical rollers, and five times the load capacity of the standard ball bearing. Cylindrical bearings are commonly used in very high-load, high-temperature applications, and also where the lubricant has a low viscosity, such as in automatic transmissions.' Either way, full kits – suitable for the entire range of 911s and Boxsters and Caymans, and including those with the bigger and already stronger post-2006 ball bearing – cost US\$849.00, and you can get details at www.europeanpartssolution.com. It is the EPS unit that renowned UK specialist Autofarm now recommends, by the way.

There is, of course, a third way: keep it standard – or more or less so, anyway. But even that is complicated, firstly by the fact that Porsche doesn't supply individual IMS bearings on their own – you have to buy the complete shaft, with both the bearing and its external support flange – and secondly by the non-availability, in any form, of the first style of shaft, with its toothed sprocket and double-row bearing. In Porsche's ideal world



design of IMS bearing are apparently unheard of. 'I've never seen one of these later, bigger IMSs let go,' says Grant. The only other possible drawback is the high cost of the necessary parts from Porsche – £800 or so for the shaft alone – and what is apparently the difficulty of getting hold of them at the moment, but the ever-enterprising company is working on its own solution to that, as well, by modifying older-style shafts. More details on this when the system is ready for production.

Yet another alternative – or perhaps an adjunct to a bearing upgrade or even a like-for-like replacement with a standard bearing – is a direct oil-feed kit. Another US company, TuneRS Motorsport, has developed just such a system, suitable for all three types of IMS bearing, and 911 & *Porsche World* contributor Johnny Tipler has had one installed in his recently acquired 996 Carrera. More details of that on pages 134–135 of the September 2015 issue.

It is naturally a fairly involved process, requiring both the separation of the engine and transmission and the replacement of the bearing's outer support flange (which would surely be the perfect opportunity, if feasible, to fit a new bearing of whatever kind you need and/or choose, regardless of whether or not it is actually needed, and perhaps a new clutch, too), but by positively passing around 400cc of engine oil per minute through the race is claimed to offer an almost indefinite lifespan. 'It's not the IMS bearing that's the issue,' argues the company, 'but rather the lack of sufficient lubrication.' Cost of the kit alone is US\$799, with fitting requiring up to about 16 hours' labour depending on the type of car. Full details – including a thorough and very interesting explanation of the ethos and development of the system – at www.tunersmotorsport.com.

Perhaps it is worth noting, however, that a similar if not quite so precisely metered supply of oil to the IMS bearing is offered as an integral feature of the EPS kit. Using the special punch supplied, and a suitable hammer, you make a small hole inside the oil-pump end of the intermediate shaft. The standard hexagonal-section oil-pump

drive shaft is then replaced with an item with a longitudinal groove machined in one face, and apparently this allows a small but steady supply of oil to make its way along the shaft to that problematic ball race.

The final weapon in the war against IMS failure – or perhaps the first – is, not entirely surprisingly, the lubricating oil itself. It goes without saying that for the overall health of the engine in general – and certainly for that of the IMS bearing – you must change both the oil and its filter at the required intervals. (Assuming you are using only top-quality materials, there is little to be gained by shortening the time and/or distance between services, unless perhaps you do a lot of trackdays. Don't, however, be tempted to increase them, even if you are using what you consider to be very best synthetic lubricant. It's just not worth the risk.)

This will give you the chance visually – and relatively cheaply – to check the oil for obvious signs of contamination (look for flecks of what appears, rather ironically, to be gold inside the filter housing), or perhaps to send a sample to Millers Oils in Brighouse, West Yorkshire, for a detailed chemical analysis. That costs around £25 plus VAT a time, but if carried out over a longer period can give you a valuable insight into precisely what 'trends' are going on throughout your engine, as it racks up ever more miles. For full details of this useful service go to www.millersoils.co.uk/automotive/millercare.

LN Engineering used to offer an on-board monitoring system – similar to those employed to monitor and protect helicopter gearboxes by attracting ferrous particles within the lubricant to a special magnetic pickup linked to an audible and visible warning device – but we understand that has now been discontinued. You still see kits for sale on eBay, and if you are a dab hand at electronics you could probably make your own version quite cheaply, but it seems an unnecessary complication to us, and the fact that it has been dropped by LN probably tells its own story. Better to spend the money on a bearing upgrade, preventive replacement with a standard Porsche or after-market bearing – or just an extra oil change. PW



IMS OR RMS? OR MAYBE BOTH?

In the early days of these water-cooled flat-sixes there was much wailing and gnashing of teeth over the subject of oil leaks, with lubricant supposedly cascading down from between the engine and transmission onto owners' garage floors. Unsurprisingly, perhaps, most people assumed the lubricant would have to be coming from the large oil seal at the end of the crankshaft, and 'RMS' issues – short for rear main seal – became one of the hottest topics on the then still relatively new internet forums. Even Porsche seems to have become convinced that this seal had to be the culprit, apparently several times modifying the design of the RMS. The fact is, though, that it was – and still is – just as likely to be the IMS flange that was/is leaking as the RMS, and since it is directly below the RMS it is impossible to make an accurate diagnosis without separating engine and gearbox. And even then it is not always easy to tell. Either way, it is another component that you should replace – or have replaced for you – whenever you have the chance. The part alone costs just £9.15 plus VAT from Porsche, and the labour – assuming your mechanic has the engine and gearbox apart for some other purpose anyway – should add only a few pounds to the bill. Be aware, though, whether you do it yourself or employ a specialist, that it is essential to use the correct Porsche fitting tool – rather than trying to tap it home with a piece of wood.

Ingeniously, EPS's upgraded IMS bearing is available for both early and later small-diameter applications, ie double- and single-row. Photo top right shows its roller-type construction, said to be capable of handling much higher loads than the original ball race. Additionally, EPS provides a special punch with which you can make a small hole inside the IMS at the oil-pump end. Into this is fitted a suitably modified oil-pump drive-shaft, whose groove allows a modest but steady supply of oil to pass along the shaft, and so more positively lubricate the IMS bearing. Also available, from TuneRS Motorsport, is a special direct oil-feed kit; see text for more details



Stripping an M96/97 requires few tools, as the author discovered some years ago, although assembly, especially of the pistons in the second of the two cylinder blocks, is not for the faint-hearted. Photo on the left shows Nick Fulljames making sure gudgeon-pin circlips are located correctly. RMS (above) not always the source of leaks; could be IMS



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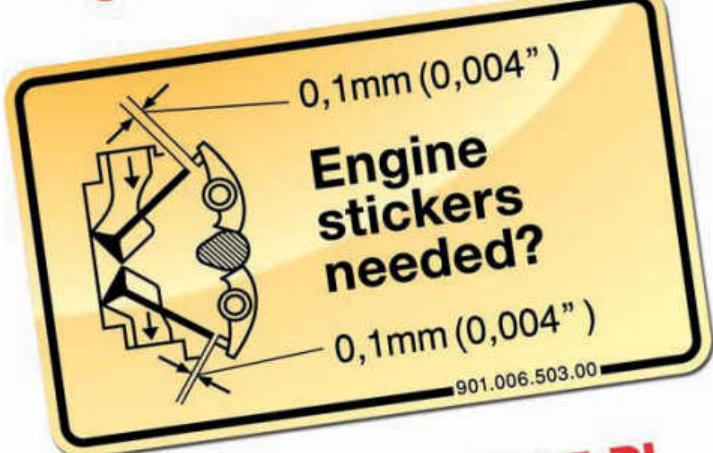
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WHAT DO YOU KNOW ABOUT IMS BEARINGS?

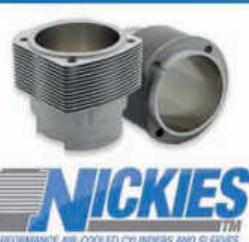
FACT 1 The M96 and M97 Engine is wet sump – the IMS is submerged in oil.

FACT 2 Ceramic hybrid bearings only need 1cc of oil per minute.

FACT 3 The dual row bearings used in the Single Row Pro and Classic Dual IMS Retrofit have load ratings equal to similarly sized roller bearings.

FACT 4 The IMS Solution, US PATENT 8,992,089 B2, is the only permanent solution that backdates your IMS to work like in an aircooled flat 6 engine.

FACT 5 With over 20,000 installations since 2008, the IMS Retrofit and Solution are trusted worldwide as the first and best.



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PROBLEM;
IT'S THE LACK
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THE PROBLEM CHILD

Born out of a liaison between Volkswagen and Porsche, the 914 had a troubled upbringing. Ultimately the victim of in-house politics, the mid-engined Targa-topped joint venture struggled first at the hands of the styling department and then the marketing department. We dig into the Porsche archives in search of reasons why the 914 appeared to be such a headache for all parties involved...

Words: Keith Seume **Photos:** Porsche Archiv

Following the on-track success of the mid-engined 904 (as featured in last month's *Archives* feature), it was inevitable that Porsche should consider producing a road-going production model with a similar drivetrain layout. In fact, one might wonder why they hadn't explored this avenue before, especially considering how Porsche No1 had been mid-engined. The inspiration came from an unlikely direction.

Porsche was becoming increasingly interested in building a new car to sell alongside the 911, as it had come under fire by certain of its dealers for not offering a tempting low-cost entry-level model. In the USA in particular, where there was a strong demand for sports cars, Porsche's agents felt they were having to fight a rearguard

action in trying to justify the high price of the 911 compared to its rivals.

A major stumbling block was the cost of developing a new car from scratch, for that is what would have to happen. The ideal would be to share development costs with a partner. This made a lot of sense for not only was money a little tight, but the production lines at Zuffenhausen were already working at capacity. If a willing partner could be found, then costs could be reduced and, hopefully, production moved to another facility. But who and where?

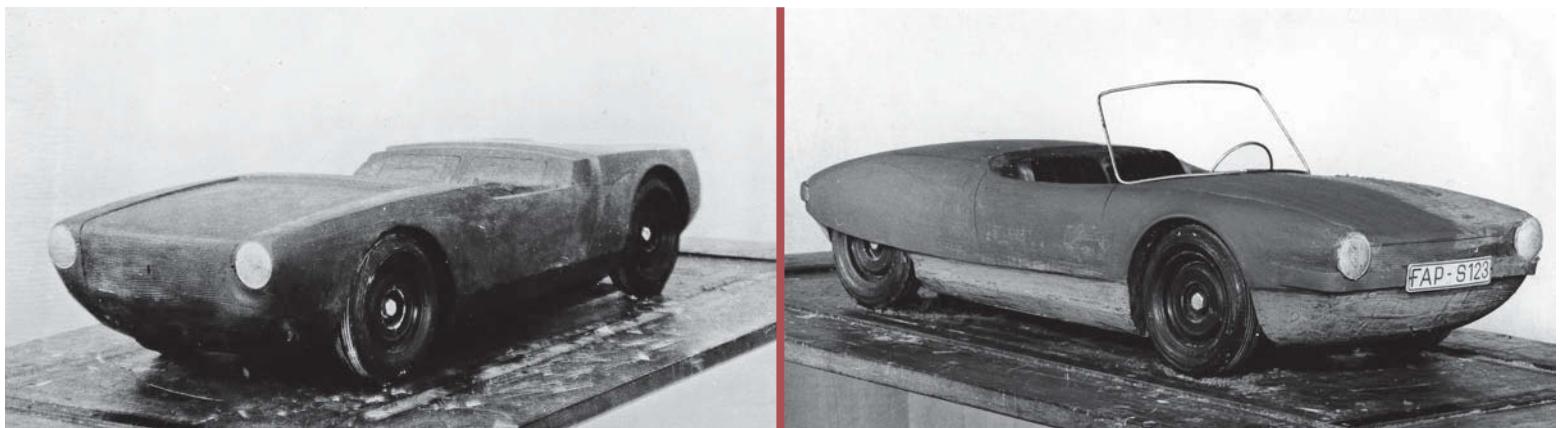
The obvious partner was Volkswagen, a company which for several years had been keen to prove it was more than a one-trick pony. For years, its boss Heinz Nordhoff had come under pressure from critics to prove there was more to Volkswagen than the

Beetle and the Transporter. In 1955, VW released the Italian-designed, German-built Karmann Ghia, a sporty coupé based on the Beetle which was more about style than substance. It looked fast but wasn't...

Following the success of the Type 3 range (better known by VW aficionados as the Fastback, Squareback and Notchback) in the first half of the 1960s, Nordhoff was keen to expand into the luxury market with an all-new model known as the Type 4, or 411. But by now it was becoming obvious that the Beetle engine would no longer be suited for use in a larger, heavier sedan. This laid the way clear for the development of a new, more powerful unit, which could also be used in the Transporter range. Or, of course, a sports car of some description.

Under Nordhoff, VW's image was

Above: Even the model struggled to smile – imagine what it was like for those involved with the 914 project when senior management showed a distinct lack of interest...



changing. First the original Karmann-Ghia, then the Type 3 and now the Type 4 – all showed that there was more to Volkswagen than met the eye. What it lacked was a true sports car, a model to draw a new breed of customers into the showroom.

There had been high hopes that the Type 3-based second generation Karmann Ghia might have been the vehicle to do this, but it was a flop. Its American-esque styling didn't appeal to the European market, and yet VW saw fit not to sell it in the USA. It was doomed from the very start.

There had been close ties between Porsche and Volkswagen from the very beginning, of course. The Beetle had been a

Porsche design but when the two companies went their separate ways after the war, the ties remained strong. The first Porsche sports cars relied heavily on VW components, but ties between the two companies went deeper than that.

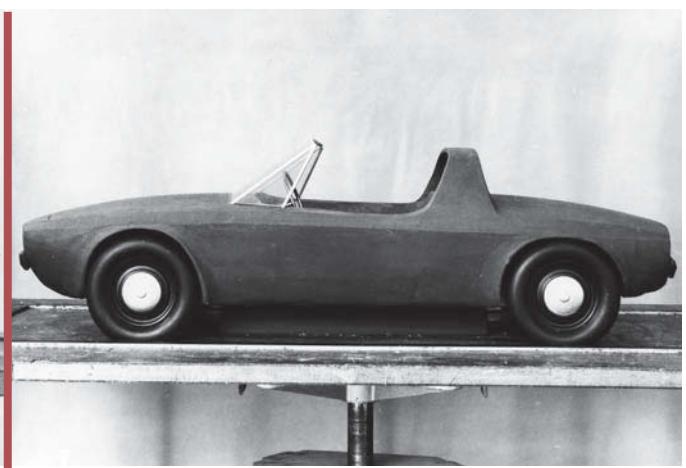
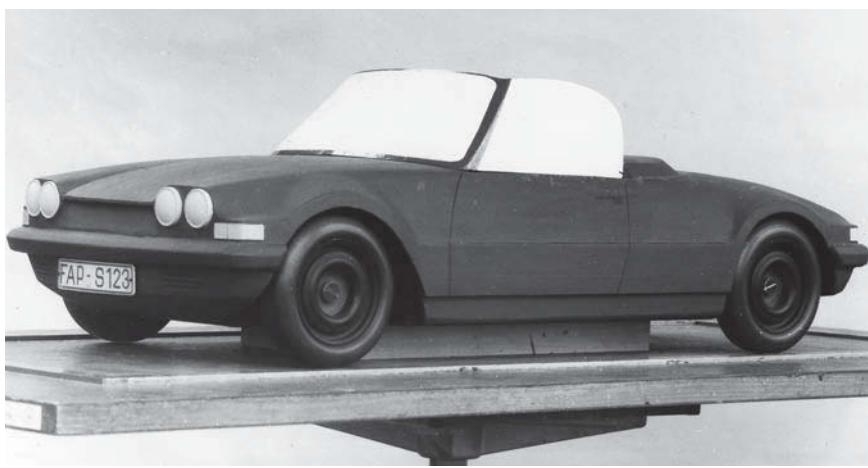
In 1948, Nordhoff signed a deal with Porsche to continue their design links, while he would later try to tempt Ferry Porsche himself to cross the divide and come to work at Volkswagen. If further proof was needed of the close ties, Nordhoff's daughter Elisabeth married the eldest son of Anton and Louise Piëch, who just happened to be Ferdinand Porsche's daughter, or to put it another way Ferry Porsche's sister.

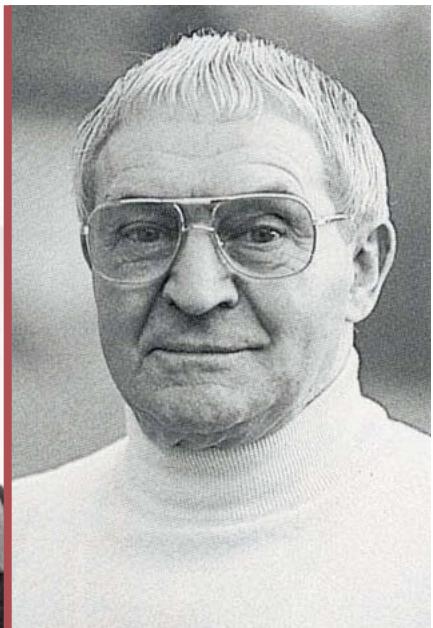
Discussions began to take place between the two companies in the mid-1960s, the subject of which was the joint development of a budget sports car. As we have seen, Porsche needed a cheaper entry-level model to bolster interest, but VW needed something with a little pizzazz to make up for the lacklustre reception received by its second generation Karmann Ghia.

Given that neither the Porsche nor Volkswagen factories had the capacity to build a new model alongside their existing ranges, there was the small matter of where production could take place. Fortunately there was a simple solution to that problem: Wilhelm Karmann GmbH at Osnabrück.

Above and top left: 1964 clay model showing first tentative in-house designs for a mid-engined sports car. Top right: May 1966 and a proposal for a more shapely 914, possibly moulded from glassfibre

Below left: July 1966 design with ungainly twin headlights
Below: Getting there. This idea dates back to March 1967





Founded in 1874, Karmann began building car bodies as early as 1902, and had close links to Volkswagen since the early 1950s when the company was chosen over rival Joseph Hebmüller to build a cabriolet version of the Beetle.

A few short years later, Karmann built the original Type 1-based Karman Ghia for VW, and also took on the responsibility for the Type 34 version in 1962. With the imminent demise of the latter, Karmann's Osnabrück factory would have all the necessary capacity to take on the new project.

A link with Porsche would be nothing new for Karmann, as the company had already built bodies for Porsche, starting with 356 coupés and continuing with the 912 and then the 911.

Discussions continued between Porsche and Volkswagen, with Ferry Porsche and Heinz Nordhoff agreeing (sealed with little more than handshake and a few scribbled notes) to a joint venture which would see Porsche designing the new car, while Volkswagen supplied the engines in the form of the new Type 4 unit. The bodies would be built at Karmann, where the final assembly of the majority of the cars would be completed using components supplied by Volkswagen.

We say 'majority' because Porsche reserved the right to use some of the bodyshells for its own 'project within a project' – what would later become known as the 911-powered 914/6, a car that was assembled alongside the contemporary 911 at Zuffenhausen.

But what of the design, the styling? This is where history, legend and myth become intertwined. From the very beginning, both Porsche and Volkswagen wanted the new car to look like no others in their respective ranges. Porsche didn't want anything to overshadow the 911 and was keen to keep some 'distance' between the new model and its existing line-up, while Volkswagen was anxious to prove it could offer a stylish sports car in stark contrast to its otherwise rather staid product range.

Many model histories written about the 914 will tell you that the curious styling was the work of Gugelot Design GmbH, situated some 50 miles from Stuttgart in Neu-Ulm. This was not the case – there is no written record of such a deal, and indeed Gugelot's own company history makes no mention of such links. But the story is repeated time and again in magazines, books and on-line. Why is this? Let's take a look.

There is no doubt that Gugelot was

interested in designing a car for a client. The majority of the studio's output had related to industrial design – Braun's famous all-white hi-fi system is a good example of Gugelot's work – but a fascination with new materials led the company to work with Bayer AG, a chemical firm with expertise in all types of plastics and GRP mouldings.

In 1964, the two companies worked together to come up with a design for a front-engined sports car which, sometime later, was then shown to the leading manufacturers, Porsche among them.

This is where it is generally assumed that it was Gugelot which came to Porsche with a design for the 914 whereas, in fact, Butzi Porsche already had his own stylists hard at work on the 914, under the guidance of Heinrich Klein.

By August 1964 (ie, ahead of Gugelot's approach to Porsche), Klein's team had produced a clay model of a two-seat roadster, with angular styling and intriguing 'cutaway' door tops. It wasn't beautiful nor did it much reflect what would eventually go into production, but it set a marker that said 'the 914 is and will be an in-house design'.

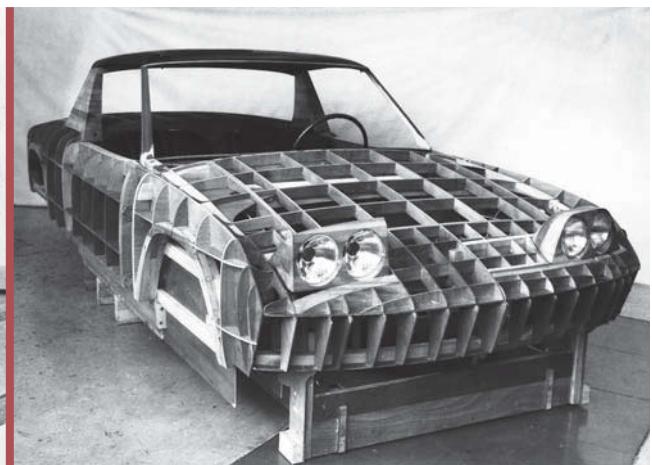
The question has to be asked as to whether Klein saw Gugelot's early designs first hand. If so, did they influence his styling

Above left: Two designs by Gugelot which some people believe were the starting point for the 914. However, there is no evidence to suggest that Hans Gugelot (above, centre) had any input in the 914 project

Above: Stylist Heinrich Klein worked under Butzi Porsche and was largely responsible for the 914's unique appearance

Below left: March 1967 and the design is almost complete – but note the cutaway doors and the wide headlamp covers

Below: Wooden buck shows how, even at this late stage, Porsche's stylists were still struggling with the headlight design





decisions in any way? Well, maybe, maybe not. Yes, there are some details that were common to both camps (cutaways in the B-pillars to act as finger space for door handles, and a deep, raked windscreens, for example) but little else. And work on Gugelot's design (based on BMW components) wasn't completed until the latter part of 1966, by which time work on the 914 was well under way. Indeed, the Gugelot concept wasn't presented to the public until the Hannover Fair in 1967.

Butzi Porsche went on record to defend his team's design, stating that 'Gugelot has not done anything on this car... There is no connection between Gugelot and the 914.'

It is true to say that every car stylist keeps his eyes open, looking at rival designs not necessarily for inspiration but certainly out of professional interest. But the Gugelot concept was not, as some would have it, 'an ideal starting point' for as we have seen work was already well under way in the Porsche design studio by the time it surfaced.

Porsche's in-house team built a number of clay models in an attempt to finalise the 914's styling. The first of these models was very basic, with no windscreens or roof pillars of any kind, just large flat front and rear 'decks'. The cutaway doors were a throwback to the old 356 America Roadster, or British sports cars such as Triumph's TR2 and Jaguar's XK120.



This gave the impression that the body – indeed the whole car – comprised two principal elements: simply put, the top and the bottom! This was a key part of the Gugelot designs, where two separate (upper and lower) mouldings were used to create the body and undertray. Certainly it is no secret that, following their use on the 904, glassfibre mouldings were considered for

However, it was a very conventional design in most other respects.

By early in the following year, Klein and his team were still struggling to finalise the design, even though it was hoped the new car could be ready for production within the next two years. In March 1967, the latest clay model did at least hint at one significant feature of the 914: the heavy rear roof pillar which also served as roll-over protection. It also suggested for the first time the inclusion of a lift-out Targa roof panel, a feature which would be introduced on the 911 and 912 the following year.

Concurrent with this particular model was another which most closely resembled the 914 as we know it today. This featured the 914's characteristic wide, flat front lid, with pop-up headlights set above the bumper. What is of interest here is that the panels covering the headlamps were wide, hinting at the use of dual units – this is confirmed by a photograph of a wooden buck used to produce prototype body panels, which clearly shows twin pop-up lights.

Almost there, then, but not quite – once again, the door tops were cut away on this model, clearly a feature that came close to making it into production. Klein's team still struggled with certain details, but on the

“ Butzi Porsche went on record to defend his team's design, stating that 'Gugelot has not done anything on this car...’ **”**

In May 1966, the stylists took a rather different approach, one which may well have been influenced to a degree by Gugelot. This second exercise showed a more rounded roadster with rear-end styling which echoed that of earlier sports-racers like the Lotus 23 and the Elva-Porsche. Apart from a high windscreens, the most noteworthy feature was a strong 'cut line' along the lower flanks, which continued across the front apron.

the 914 but rejected on the grounds that it was a time-consuming process unsuited to mass-production.

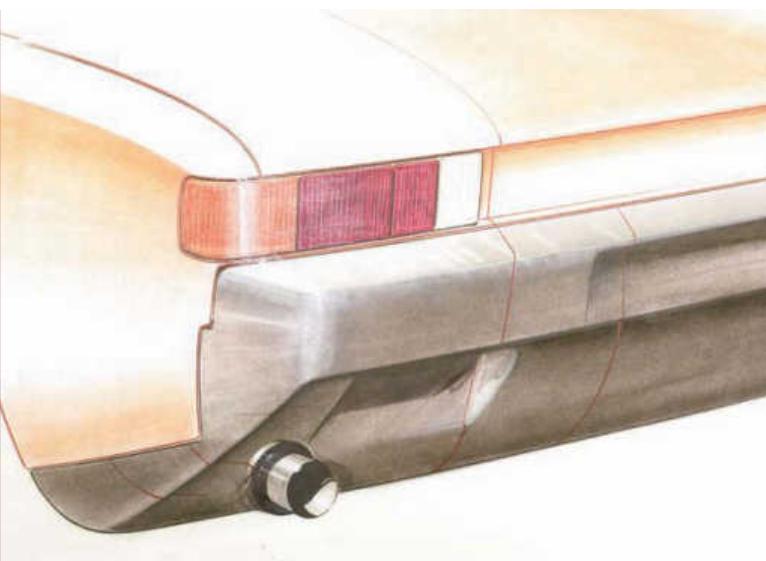
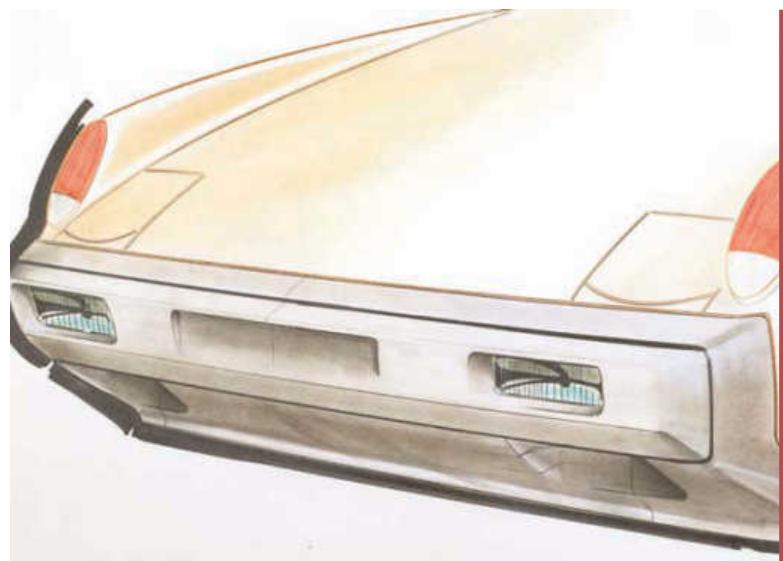
By July 1966, yet another model hinted at the direction Porsche's stylists were heading. This was a more angular design, though still with a sloping side profile, which featured rather ungainly dual headlights set proud of the nose. In many ways, this feature was not dissimilar to the headlight arrangement on the much later Jaguar XJS.

Above: Final measurements are taken off a wooden buck that are then transferred to tooling



Far left: The German press was desperate to discover what the new VW-Porsche would look like

Left: Even as the 914 was almost ready for production, alternative styling ideas were being tried



whole the 914's external form was set.

In contrast to the problems which had plagued the styling process, deciding upon the mechanical specification was a far simpler matter. Volkswagen had the perfect engine sitting ready to be used – the 80bhp 1.7-litre Type 4 unit – while Porsche had the ideal gearbox: the 901-series five-speed unit. As this was designed for use in the

rear-engined 911, it was necessary to swap the crown wheel to the opposite side of the gearbox to give five forward gears in its new mid-engined application.

Aside from that, it was ideal – as was the entire front suspension assembly from the 911, torsion bars, cross-member, struts and all. Only the front hubs were changed to allow the use of the VW 411's front discs.

At the rear, things became a little more complicated (and expensive), as mid-mounting the engine meant that the 911's trademark transverse torsion bars could no longer be used. Instead, Porsche's engineers opted for coil-over rear damper units that were unique to the new model (as were the rear disc brakes).

Porsche's take on the 914 was the 914/6, the name hinting at what filled the space behind the driver. The 'basic' 2.0-litre 911 engine, with just 110bhp available, was the chosen unit. It did not make the 914/6 the fastest car on the road, nor did it embarrass the 911 in outright performance (Porsche was very keen that the new model shouldn't overshadow the flagship 911...) but, as time was to prove, what it lost in horsepower it made up for in handling. It also featured more powerful 911-sourced brakes, necessitating the use of five-lug wheels, compared to the four-cylinder version's Volkswagen-sourced four-lug rims.

The 914 (and 914/6) was about ready to go into production when it fell victim to a period of upheaval at Volkswagen. In 1968, Heinz Nordhoff, in many ways the father (or at least one of the parents) of the 914, fell seriously ill. He was due to retire in 1970 and had already chosen his successor, Kurt Lotz, an industrialist with little background knowledge of the automotive industry.

The plan had been for Lotz to work alongside Nordhoff during the final two years of his tenure at VW, but such plans were turned on their head when Nordhoff's condition worsened in the summer of 1968. He passed away in April the following year, leaving a vacuum which Lotz would struggle to fill.

He made no secret of the fact that the 914 was, in his eyes, an unnecessary diversion – his main interest lay in more mainstream passenger cars which he saw as a profit source. However, he did appreciate the links with Porsche in terms of engineering design, and was keen to build on that relationship. Indeed, his promise of new projects – principally the EA266 passenger car – encouraged Porsche to invest a lot of money in expanding the Weissach test facility.

Above: Once in production, work continued on ways to improve the 914's looks – especially those destined for the USA which had to meet the strict new '5mph' bumper laws

“ Lotz made no secret of the fact that the 914 was, in his eyes, an unnecessary diversion... **”**



Left: Located at Ludwigsburg to the north of Stuttgart, the new VW-Porsche sales and parts operation was completed in 1971. At this time, rumours were flying round that Volkswagen was about to absorb Porsche into its operation, rumours which Porsche was keen to quash



But Lotz was not so impressed when he took a look at the 'contract' that existed between his company and Porsche. He was horrified to discover that no formal detailed contract existed – it was tantamount to a gentlemen's agreement, albeit one which allowed Porsche to do as it pleased with its half of the project. Lotz insisted on sticking to the letter of the contract, which suggested that the 914 was VW's project, and one which he didn't want to relinquish the rights to.

Porsche, for its part, was very keen to hang on to the 914/6, which had an important role to play by giving the dealers a low-cost alternative to the 911 to entice new customers into the showroom.

At the same time, Lotz faced another problem: how to introduce the Audi range into North America, a market where VW was coming under pressure from domestic manufacturers who now regarded the sub-compact market as an important one. After considerable debate between Lotz and his opposite numbers in Stuttgart, a solution was reached whereby Porsche would hand over the task of selling its products in the USA to VW, which would then launch a new operation – the Porsche + Audi Division – to sell, well, Porsches and Audis, while Volkswagens would continue to be sold through the existing VW dealer network.

The final piece of a rather large and costly jigsaw saw Volkswagen and Porsche launch a new company to sell not only the 914 and any future jointly-financed projects but also the current Porsche model, namely the 911 (the 912 was to be phased out in favour of the 914). The new company was called VW-Porsche Vertriebsgesellschaft GmbH, or 'VG' for short.

Owned on a 50/50 basis by the two parent companies, VG had two managing directors – one to represent the interests of Porsche, the other those of Volkswagen. In charge of PR was non other than the almost legendary Huschke von Hanstein. A 17.3-acre site was acquired at Ludwigsburg to the north of Stuttgart, where an entirely new sales and spares operation was created in a modern purpose-designed industrial unit.

This move, along with the reorganisation of Porsche sales in North America, gave rise to intense speculation that Porsche was about to be swallowed up by the ever-expanding Volkswagen operation, a rumour which Porsche was keen to quash.

The joint operation worked well in most respects. Bodies for the 914 were assembled by Karmann into complete cars for sale by Volkswagen, while those destined for the Porsche dealers were sent fully trimmed and painted to Stuttgart for assembly alongside the 911. All was fine

and dandy until it came to the matter of costs: Volkswagen demanded that Karmann charge Porsche more for its supply of 914 bodyshells than it did for the more complex 911 shells which Karmann also built. Why? Because it saw the 914 as a low-volume product, with high tooling costs, and the only way the project could be viable was to increase the cost of the raw components, such as the bodyshells!

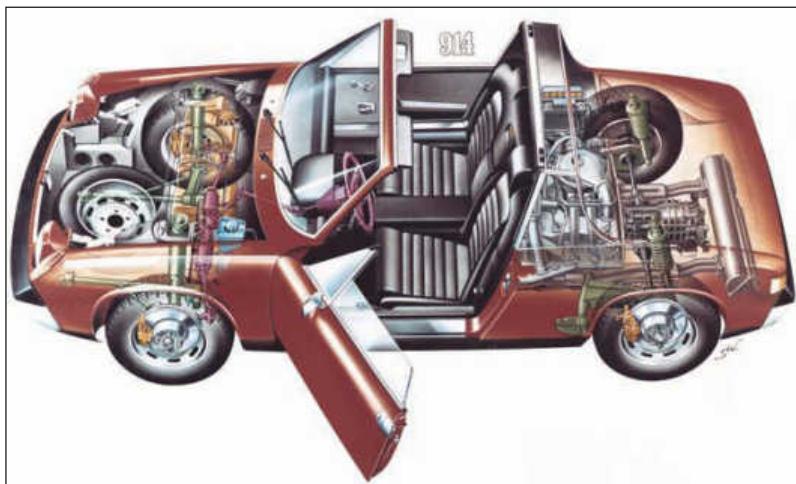
Another problem reared its head when Volkswagen insisted that all models sold on the domestic market be badged as 'VW-Porsche', a clumsy amalgam which displeased the Porsche marketing department and which served only to confuse customers. Fortunately, in the vital North American market, the cars were sold simply as Porsches, although they never wore a Porsche crest of any kind.

The 914 went on to become a reasonable success, but certainly wasn't the source of profit which Porsche had hoped for. Its days were numbered when, in October 1971, Kurt Lotz stepped aside to make way for Rudolph Leiding. He was a tough man to argue with and set about reorganising the VW operation in a ruthless fashion. Gone was any further investment in air-cooled cars – the future lay in water cooling, a decision that would one day lead to the birth of a new joint venture: the 924... PW

Above and left: Well, job done – or was it? After several years of wrangling, the first 914s undergo testing at Weissach. Little did anyone know at the time what turbulent times still lay ahead

Below left: The 914 was an ingenious design, with large front and rear boots, and a spacious cockpit. What it lacked was commitment from Volkswagen...

Below: Ferry Porsche receives his birthday present – a 914/8, one of just two built



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TECH SECTION

PRACTICAL PORSCHE

Welcome to the grubby end of the magazine, where the glossy features give way to the oily bits. Too often ignored, this is the beating heart of Porschedom, where we strip, mend and modify our machines and yours

HOW TO: 102

With our big M96/M97 engine insight on p82, it's fitting that this month's 'How to' feature should cover M96 IMS bearing replacement in all its technical glory.



SPECIALIST: 108

Looking for a Porsche specialist in the West Country? We drop in on Honiton based SCS Porsche, where they're tackling everything from a GT2 gearbox rebuild to a 924 service.

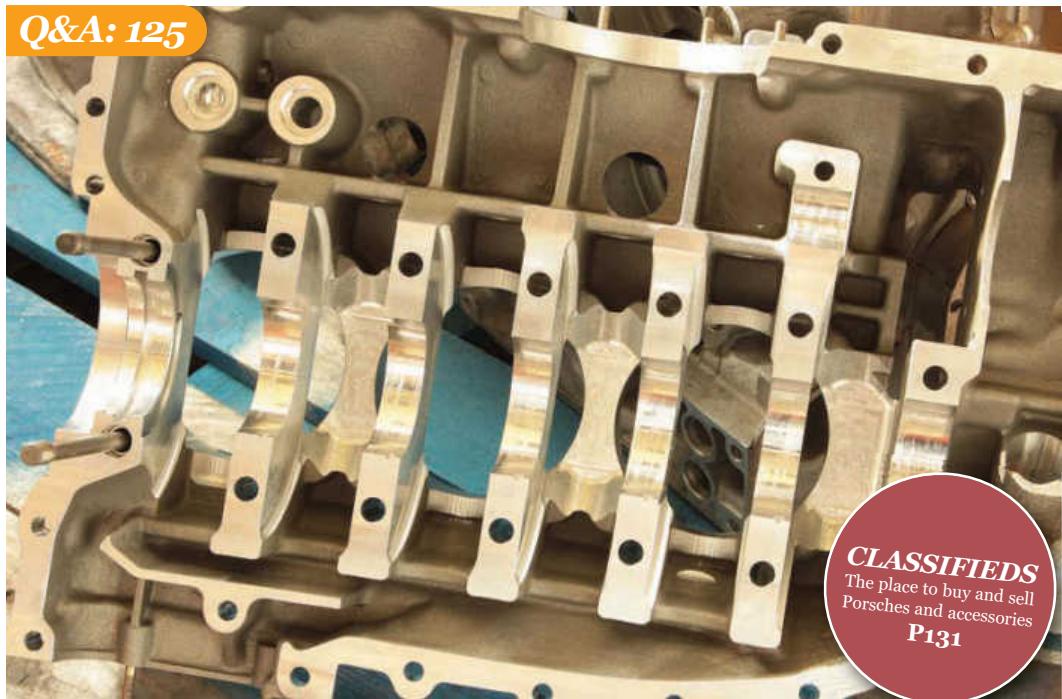


OUR CARS: 114

More adventures from the 911&PW fleet. Ken Coad's 968 gets a power steering overhaul and a Porsche Classic infotainment system. Tipler's Boxster gets sat on and Pete Simpson's '73 Targa project gets wheels and some very trick engine bits.



Q&A: 125



You ask, we answer; well, our tech guru, Chris Horton does, together with his crack squad of Porsche experts. This month we look at 944 tailgate seals, 997 engine ignition 'events' and aftermarket classic 911 crank cases.

MARKET WATCH: 132

What to look for when buying a 944, plus dealer talk with Mark Sumpter at Paragon Porsche and a round up of the latest sales and auction results and trends.



TRIED & TESTED: 141

Getting out there and kicking the tyres! This month our man Horton checks out a 986 Boxster S in a fetching shade of pink. Suits you, sir!



DETAILING: 129

The latest trend is for matte finishes, whether a wrap or painted. Trouble is they're tricky to look after, requiring specialist techniques.



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THE LUCK OF THE DRAW

How else to explain two almost identical IMS failures, in two almost identical 996 Carreras, but in at least one instance resulting in no consequential engine damage? And there is a fair chance that the second owner might have got away with it, too. Story and photographs by Chris Horton



There can surely be few better illustrations of the famous chaos theory – in its most simplistic and colloquial form, anyway – than the behaviour of certain mechanical assemblies, and the individual components from which they are put together. Why some fail and others do not, basically. And why, having failed, some parts immediately start a catastrophic chain

reaction, but others somehow hold it all together just long enough for the machine concerned to be brought safely to a standstill, and repaired before any further damage occurs. Perhaps it is really nothing more than luck or coincidence.

Take the case of two almost identical – even down to colour – 2003-model 996 Carrera 4Ss. (And what are the chances of two of those coming along at the same

time, never mind with the same problem?) One we strongly suspect has suffered an IMS-bearing meltdown, and possibly damage to the valves and pistons – although that won't be confirmed until the car has been repatriated to the UK (see panel on page 105) and the engine stripped at Harteck. The other we know suffered a failure of this small but vital item, but remarkably without any effect on the

Accessing the IMS bearing means separating the engine from the gearbox, and in Tiptronic cars such as this by far the best method is to remove the entire power unit – the transmission is massively heavy, and so awkward to handle

Transmission was showing signs of an oil leak, but here that's from the breather rather than rear housing – and which we featured as a how-to in the April 2015 issue. First task is (gently – just in case the timing has slipped) to turn the crankshaft to the designated TDC position, and lock it with this special tool (middle). Next take out plugs covering ends of camshafts to check that valve timing is still correct – note offset position of slots. If not, valves may have hit pistons, and a stripdown will be needed. You will need new plugs. Remove the two actuators for the timing chain tensioners, from beneath the engine. Undo screws through bellhousing, and carefully ease engine and 'box apart. Note the second pin to retain the torque converter



timing chains and valvegear. Indeed, the engine was still running when Porsche-Torque's Sid Malik took the call about what the car's owner described as the proverbial 'funny noise' – although fortunately the latter was persuaded to have it transported

to Sid's Uxbridge workshop on a truck.

Certainly the repair – shown in the accompanying photographs, and notably with an entirely standard proprietary bearing from SKF – is something of a compromise. (But not, we hasten to add, because of the

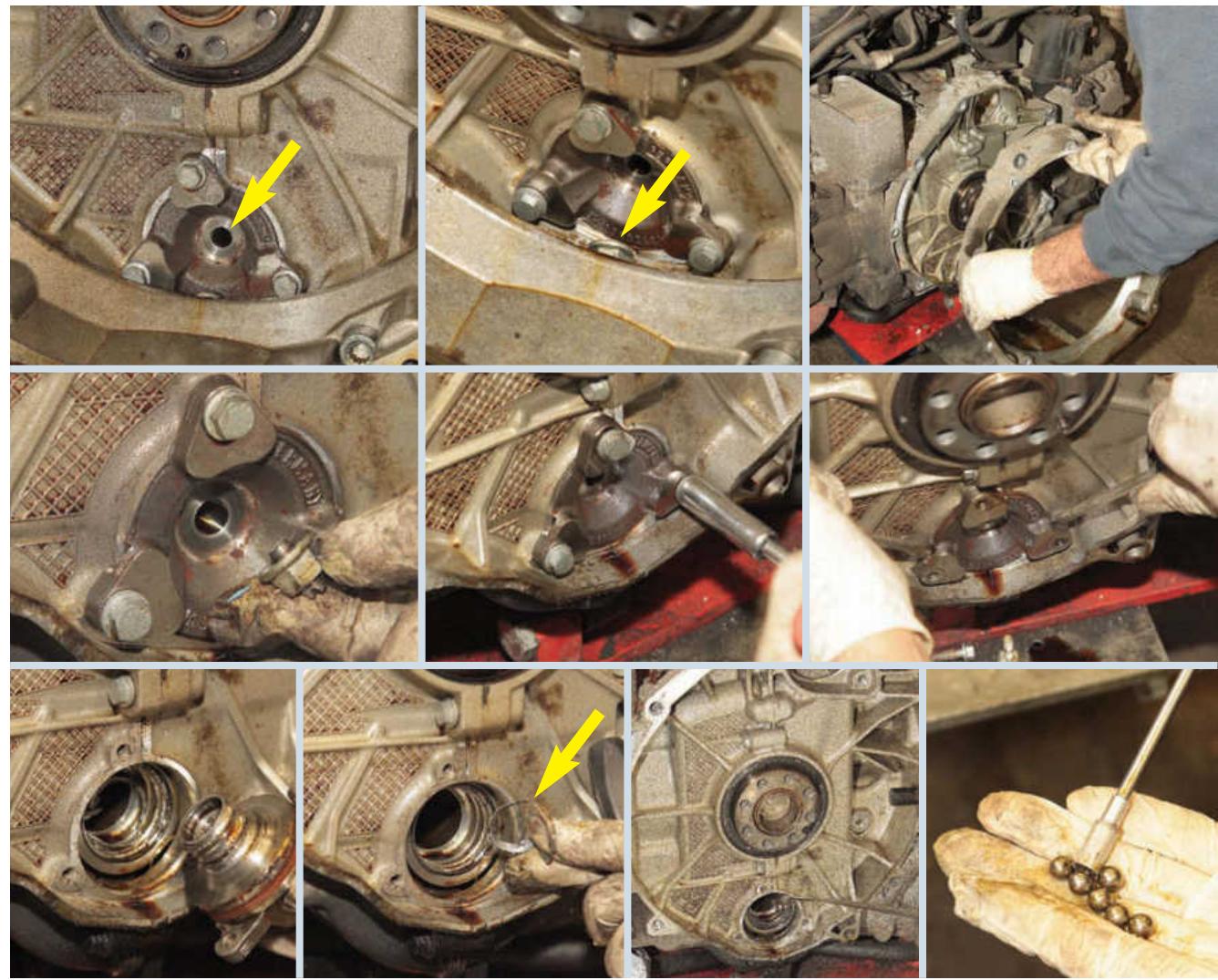
source of the new bearing.) Sid, thanks to both his armoury of tools and his long experience and inherent skill, was able to extract the remains of the failed bearing, and swarf from it appeared not to have spread, away from the rear end of the

First sign of trouble was this ominous-looking hole (right) where a 13mm self-locking nut should have been, on the end of the stud holding the IMS-bearing assembly together. Luckily, that had lodged safely behind the adaptor plate (middle), rather than being flung around by the torque converter – although it did show one or two minor battle scars.

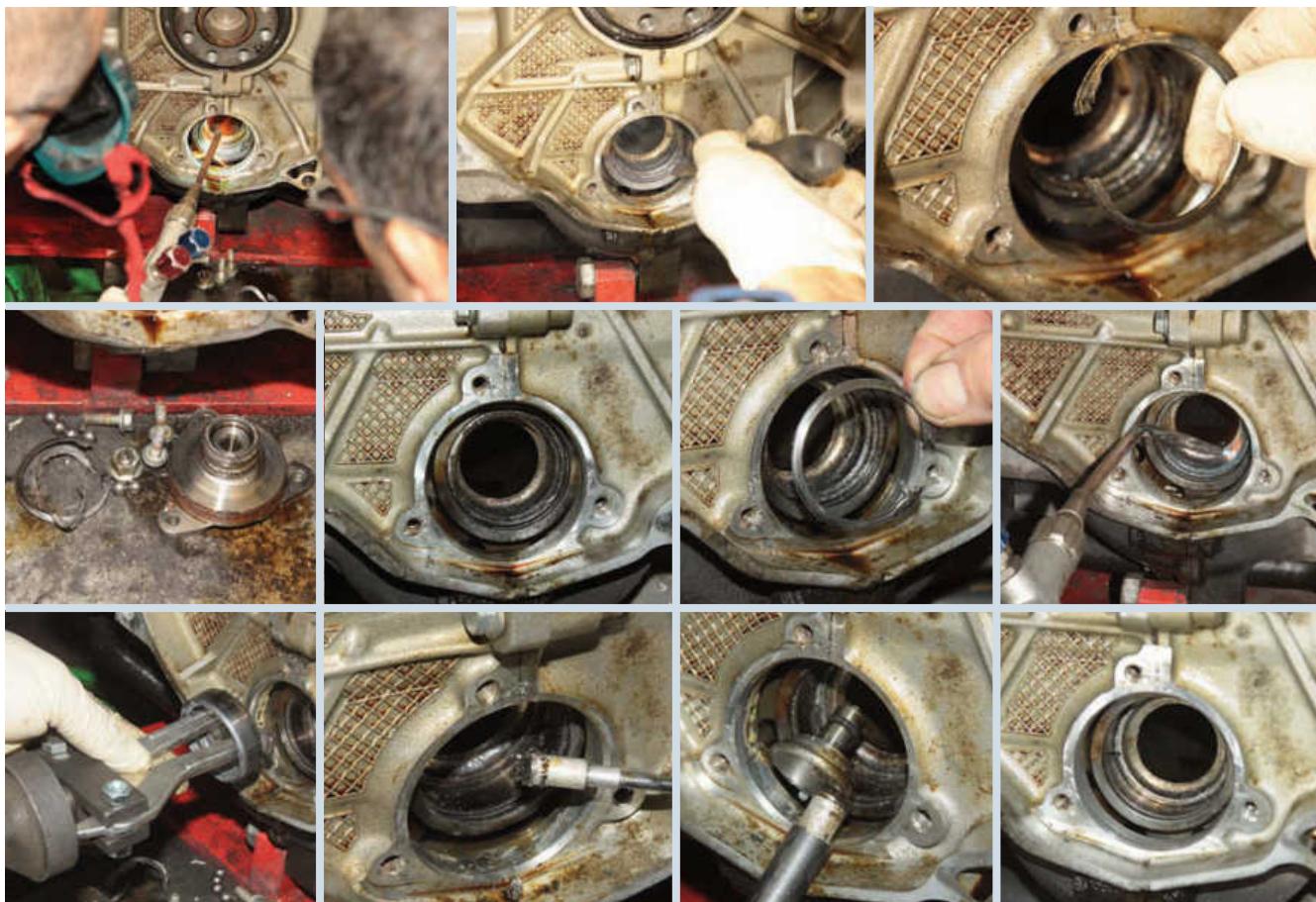
Could this be a portent of things to come, whether good or bad? IMS flange is secured by three M6 hex-head screws; undo those, and carefully lever off the flange. Note oil leak: at this stage it's hard to tell if it's from the

IMS, or the RMS immediately above it.

Inside, bearing has disintegrated: outer track is still in the intermediate shaft, and the inner has possibly friction-welded itself to the spigot on the inside of the flange (and either way that item is scrap). Not sure what this piece used to be (arrowed, right). Balls from bearing had migrated to far end of hollow shaft, but all were retrieved with a magnet. More luck!



TECH: HOW TO



intermediate shaft. There were signs of metallic particles inside the oil-filter housing, so ideally the entire engine would have to be completely disassembled, and every

oilway opened up for inspection and cleaning to make absolutely sure there was no such contamination. But who, with a car of the likely value of this one, is today going

to pay a possibly five-figure sum for that alone if they can avoid it? 'You just have to give the customer all the options,' says Sid, 'and let them decide what they want to do.'

Bearing's outer track is, in an engine of this period, designed to be secured in its rebate in the end of the intermediate shaft by means of an internal circlip, but such was the damage to the entire assembly that it was hard even to see the clip, never mind to extract it. In the end, Sid heated the spring steel with a gas torch to make it a bit more pliable, and then managed to get at it with a small, pointed punch. Even then the bearing track itself didn't look like it was going to budge any time soon, but again heat and this special puller attached to a slide hammer (below, far left) got it moving surprisingly easily. Yet another lucky break! Magnet retrieved still more potentially harmful swarf from inside shaft – none appeared to have migrated into the remainder of the crankcase – and then the remains of the central 'button'



New bearing flange and button have never been available separately from Porsche (you have to buy the complete shaft), but luckily Sid Malik has many good spares, salvaged from broken engines. With a new outer seal and inner 'O'-ring they are as good as new. Bearing chosen was an SKF item from a local trade supplier – virtually every large town in the UK has one. It might be rather harder to find the deeper, double-row item from earlier engines, though. Button is tapped through inner race – support that on a suitable socket to avoid damage – and then temporarily secured to this special installation drift with a 13mm nut on the stud, tightened and later removed with a suitably deep socket. Making sure rebate is free from dirt and burrs, lightly grease outer track to aid installation, and gently tap home with copper hammer

Thanks to Sid Malik and Luciano Balducci (the latter having recently started work for Sid, after 30 years' experience in UK Porsche Centres) for their assistance with this feature. Porsche-Torque is at Unit C2, Arun Buildings, Arundel Road, Uxbridge UB8 2RP; tel: 01895 814446; www.porsche-torque.com.

See also the four-page how-to story in the September 2012 edition of *911 & Porsche World* for a feature about fitting an upgraded replacement IMS bearing from LN Engineering, plus a crankshaft RMS

Bearing appeared to be sitting snugly within its rebate, but the 'new' circlip, also salvaged from another engine, wouldn't click 100 per cent securely into its locating groove, so wisely Sid removed the bearing again – this time with an expanding puller attached to a slide hammer – to check why. Good job, too: circlip rotated freely enough in its now empty groove (top row, far right), but there remained some wafer-thin slivers of the original bearing track preventing the new one pushing in as far as it should. Sid extracted those with a pick, and then all was well. Bearing flange was refitted with sealant on any possible source of an oil leak (including the threads of the three securing screws, tightened to 10Nm), and also behind the 13mm central nut, tightened to 13Nm.

Chain tensioners fitted with new sealing washers and tightened to 80Nm, and then, with the valve timing known still to be correct, the crank could be rotated to check that all was well. Final task was to replace the RMS, or crankshaft rear main seal. More on that next month. Was the repair successful? Yes! Car is now back on the road, and all for £1900 plus VAT. Not cheap, then – but it could have been so much more expensive

A WARNING FROM (VERY RECENT) HISTORY

I bought my beautiful 996 Carrera 4S, writes *Alun Morris*, which also has the X51 power kit and a full Porsche service history, partly as a result of seeing it in *911 & Porsche World*. It was one of the *Tried & Tested* stories in the June 2012 issue. Since then I have done around 22,000 miles in the car, and it has been serviced annually by my local Porsche Centre.

Last year I filled it with Evans Waterless Coolant, and after several discussions with Chris Horton was planning on having the clutch and the IMS bearing changed during 2016. Until recently I was paying a monthly fee for an engine warranty, but given the age of the car this was becoming expensive in relation to any possible benefits, and so I started a 'war chest' for the cost of the clutch and the IMS, and any other issues.

I am always very careful about warming up the engine before driving the Porsche even moderately hard, and obsessively check for oil and coolant leaks. So you can imagine how utterly horrified I was when my wife rang me one day to say that she had broken down in the middle of Leuven in Belgium. (I work in Brussels, but broadly speaking divide my time between there and the UK.)

She was pulling away from traffic lights when she heard a loud screeching sound. She thought another car had been involved in an accident, but then realised it was ours making the noise, with a loss of power. She coasted 100 metres or so, and came to a halt in a bus lane. When I got there I could see no oil on the floor, no obvious loss of coolant, no black debris or tell-tale smoke marks

around the exhaust tailpipes.

Rightly or wrongly, I tried to start the engine, and amazingly it fired, but the oil pressure was only about 1.0 bar, and I could hear a horrible noise, and what sounded like a clattering of camshaft chains. I switched off immediately, and have not tried running it since. I called Chris Horton – who by chance was not far away, in northern France – and eventually we concluded that it is almost certainly the IMS bearing that has failed.

Chris offered to strip down the engine, in conjunction with one of his Porsche specialist colleagues, if I could get the car back to England. I was grateful for that, of course,

but in the end we decided to have it sent to Harteck in Bolton, Lancashire, where they will take the engine apart, with Chris going up to make notes and take photographs.

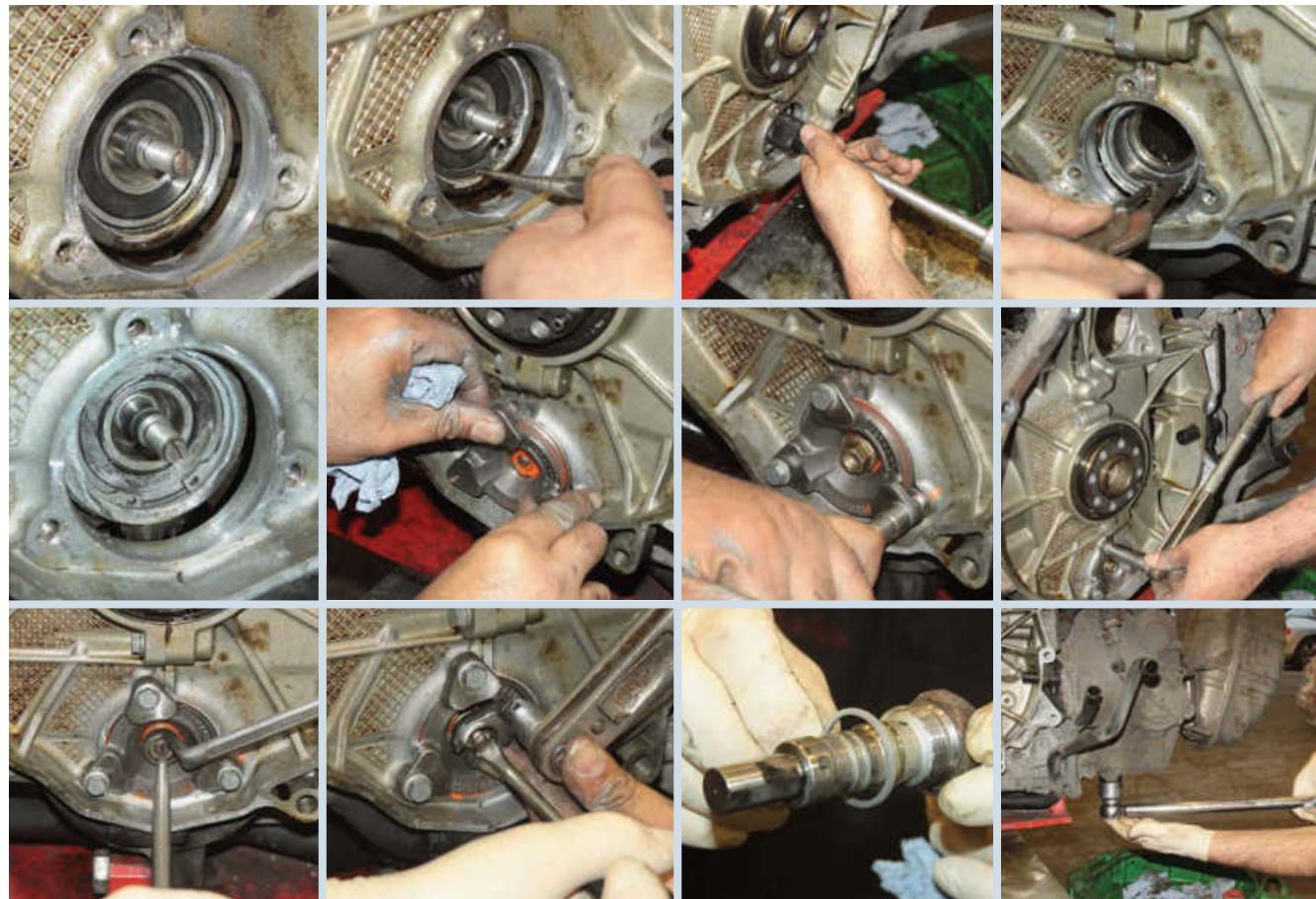
Either way, he assures me, it will make a great story, and we are both clinging to the possibility that, since the engine was running at barely more than idle speed, there may be little or even no damage to the valves and pistons. Chris has shown me the photos he was planning to use for his how-to story in this issue – co-incidentally on an IMS problem in another almost identical 2003 Carrera 4S – so if that owner got away with it, then maybe I will, too. Fingers crossed!



That is not to suggest that Sid will simply refit the engine and gearbox and hope for the best. 'Naturally we shall give the car a much longer than normal road-test,' he says, 'and change both the oil and the filter again at the end of it. What's more, I shall

explain to the customer what we have done, and why we did it, and have him bring the car back for yet another oil and filter change after a couple of thousand miles. Maybe even another one, a thousand miles after that. That in itself has a not

insignificant cost, but it is still far cheaper than an engine rebuild.' Indeed. Sometimes – even as a caring Porsche owner – you simply have to accept that life is less than perfect, and hope for the best. Because the alternative is just too much to take in. PW



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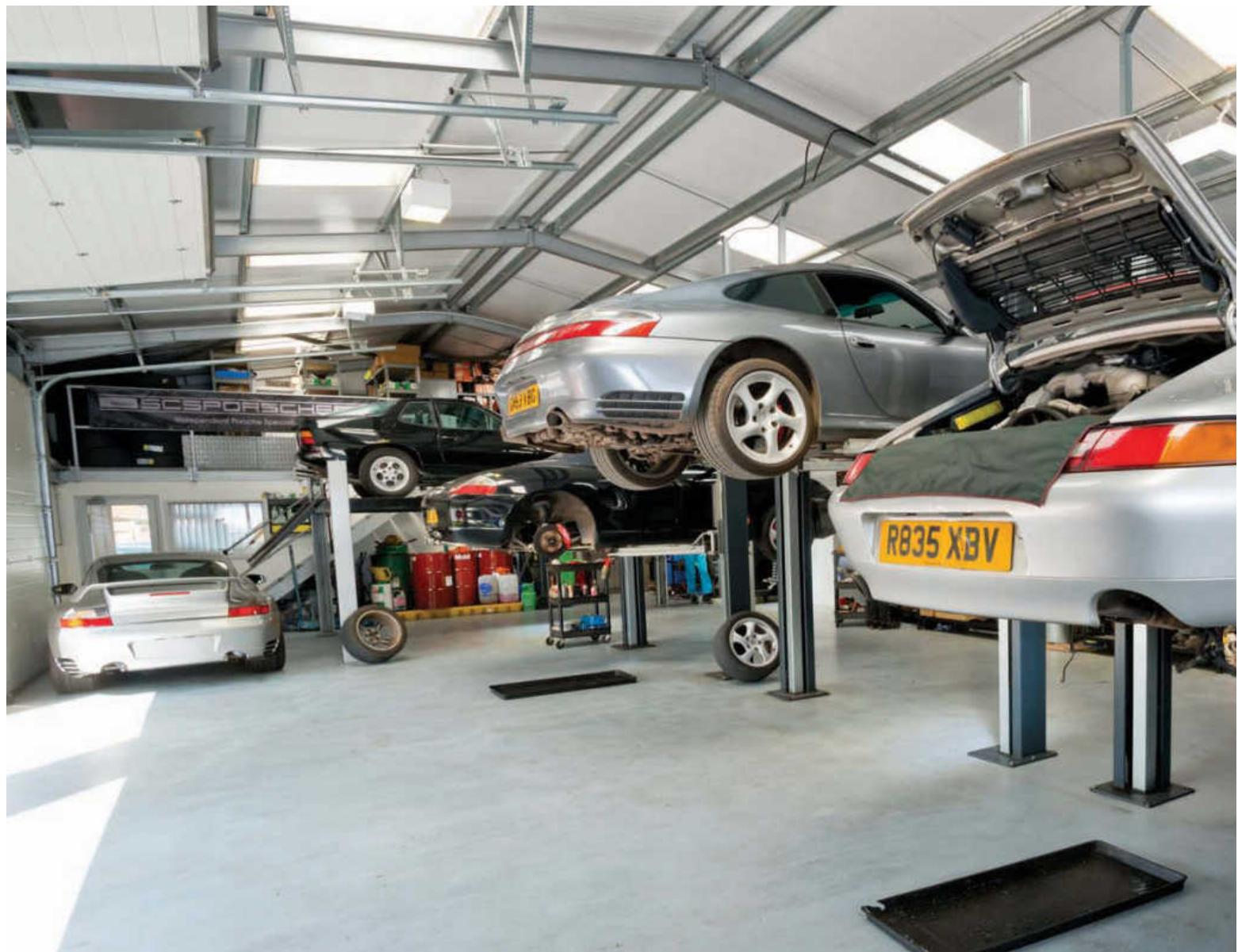
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GO WEST YOUNG MAN!

Cruising the West Country, we hover at Honiton to meet Porsche specialists SCS, hot bed for Porsche servicing and repair for its 250+ customer base across Devon and Cornwall

Words: Johnny Tipler Photography: Antony Fraser



I'm at Sports Car Services – that's SCS to you and me – to meet the team, Andy Moss and Stuart Manvell. They specialise in servicing and repairing Porsches, and they have a couple of restoration projects on the go. Poised on the border between south Somerset and north Devon, a stone's-throw (literally) from the busy A303 at Honiton, SCS's premises is on the old road, long bypassed, and as we found, it's ideal for road testing Porsches. There's a deer park down the road and we are but a dense hedge away from the Honiton by-pass.

SCS reckon to have 250 regular customers in the south west, and one devotee who even comes over from France on the Plymouth ferry. The brand new SCS

workshop was formerly the site of cattle sheds, and because it's adjacent to the working farm, from the outside it would be easy to take it for a modern agricultural building – except for the varied array of Porsches lined up outside in the yard. That's always a pretty good indicator of the range of models a garage handles, and here they include a couple of 993s, a trio of 996 Turbos, no less, a 996 GT2, a 928, a 968, a 924, a 930, a 3.2 Carrera, several Boxsters, a Honda Firestorm and a Suzuki Hayabusa. That's a comprehensive cross-section of Porsche's more recent history on anybody's forecast, plus a couple of strays for good measure.

In the garage, spanner-wielding mechanics Dan and Kieran are working away, busy fettling a 996 C4S and servicing a 987 Boxster; there's a 997 GT2 in the

throes of a gearbox rebuild, and a Cayenne with a window issue, up on the ramps in the spic 'n' span new workshop. In the adjoining office, secretary Marian mans the phone and deals with admin and invoicing.

They've got all the state-of-the-art diagnostics equipment in the workshops to handle current models, and they're currently restoring a 1970 911E, inserting new floors and powder coating its suspension in the process. They handle young-timer classics, too, having restored two 924Ss in the past two years. 'We get a lot of those kind of cars,' Andy tells me, 'where the value was so low that they've just been parked up and forgotten about. But they're well worth recommissioning now.'

To prove the point, Andy had just returned with a 968 CS, ripe for restoration. 'It was green with mould, having sat under

A typical workshop scene at SCS (Sports Car Services). On the ramps 993, 996, Boxster and a 924 vie for attention. 997 GT2 in the corner is in for a gearbox rebuild

Right: GT2 engine, minus its gearbox. These Mezger derived engines rarely go wrong, although SCS did have to rebuild a 997 Turbo S engine recently



a tree for ages, and we'll work our way through it and sell it when it's reached a nice standard. It's good to have a little project on the back burner.' They've got a 944 Turbo for sale at the moment as well. Andy is sceptical about escalating secondhand Porsche values though, and is not minded to join the fray: 'The 993 has lifted everything else up, and now, what about 964s and 3.2 Carreras? It's very difficult to judge, and no one knows where it will end up. It's just like fishing, isn't it? They stick a big premium on and see what happens. We're not in the business of selling cars, but we will sell our customers' cars for them.'

Andy founded SCS in 2003 after leaving OPC Exeter. He'd worked in the Porsche network since 1987, took a break in 1990 and travelled to Australia to manage a Porsche specialist in Adelaide. After eight

months he returned to England and worked for VW-Audi and the Lotus dealer in Exeter, and then spent 11 years at OPC before setting up SCS at Honiton. In 2011 Stuart Manvell joined Andy, having worked for OPC Exeter for eight years. 'Exeter is a good hub for business,' reckons Andy, 'but

know about the older stuff, like changing points and tweaking carburettors. You want technicians to be stretched, thinking, "how do I do this, how do I fix that, how do I get this undone?" All the best technicians I've worked with in the last 30 years have been from small workshops rather than the main

“ Between them they have 24 years of Porsche factory training ”

we both originally did our apprenticeships in small garages in Honiton. Our guys have previously worked within the franchised dealerships, but they've moved on, so they've got the depth of knowledge and experience to think on their feet. They also

dealerships.' They set great store by the fact that Stuart won the OPC Silver Technician award, and between them they have 24 years of Porsche factory training and over 50 factory training courses completed at Porsche GB. They'll



Team SCS with Andy Moss and Stuart Manvell in the foreground and signature 964 C4 Cabriolet

TECH: SPECIALIST



Left: Stuart Manvell (middle) and Andy Moss (right). Both are ex-Porsche Centre Exeter, with Stuart the recipient of a Porsche Centre Silver Technician award. Between them they have over 24 years of Porsche factory training

CRÈME DE CASSIS

To whet our appetite, SCS have provided a very fine 964 Carrera 4 Cabriolet for a run up the nearby Blackdown Hills. The fetching hue of our test car is called "Cassis Red Metallic", a special order colour from 1990, first year of 964 C4 Cabrio production. Apparently the shell was first painted white, and then sent back to the factory paintshop to be recoated in the iridescent pigment. 'That's what they used to do with all their special orders back in the '80s,' says Andy; 'they used a white bodyshell and then went from that as a base colour to the special order metallic red. The only clue where you can see the white is inside the engine bay where there's a little bit by the oil filter. Over the years the oil has dissolved the top coat.' It's recorded 92,000 miles, which is fair for a 25-year-old 964. Supplied with a factory hard top, it was also spec'd up with gold centred BBS wheels. SCS hold all the paperwork including receipts and service history from day one. Now on its third owner, who's owned it for two years and who lives and works on a luxury yacht off Saudi, SCS also looked after the car for nine years for the second owner who lived in Singapore. During that time they've done a top end rebuild on the engine: 'It had a refresh about five years ago, valve guides – favourite things on these – new timing chains, fixing oil leaks to the old crankcase seals.' They also fitted Bilstein dampers and H&R springs as part of the improvement programme. 'The ride height was lowered a little bit – 10mm – because the Carrera 4s were always too tall at the front, and in fact the last production run they dropped them down even lower. Its front discs are cross-drilled, upgraded during normal maintenance, and the rears were programmed for similar treatment until the

owner cried off. Subtle enhancements, really, but probably unique in that spec with those accessories.' The seats are trimmed with red leather piping, and the driver's seat had the top section replaced five years ago by their local trimmer. The sports exhaust system includes a G-pipe, and there's no cat, just a TechArt sports silencer and standard rear centre box, so it's missing one silencer. 'With the TechArt kit and the middle box left out, you can get an extra 12 horsepower.' Now, though, the owner thinks that, with the way 964 values are heading, the car ought to go back to standard, including Cup wheels and no rear wing, when it could realise getting on for £40K. 'Now he's looking to buy a Turbo, so it's not being used really, because, in his head at least, he's moved on.'

The current wheels are 997 Carrera S rims, 8in and 10in x 18in, shod with Pirelli P-Zeros, 225/40 ZR x 18 on the front and 265/35 ZR x 18 on the back. 'Ideally it should be on Cup 1s,' says Andy, 'and that's on the owner's wish list. Those wheels are obviously 2005 model era, which lift the car up, age-wise. And yet it doesn't say, "I'm trying to be a more modern car than I really am," they're just different wheels that somehow just suit it, don't they?'

Although it's fitted with an RS steering wheel the original is still with the car and would be refitted if it was returned to standard, though frankly it looks pretty amazing as it stands. The cockpit features an Alpine radio cassette player, and grey carpets. There's no strut brace, and the original canopy is beginning to show a little bit of wear, though it operates perfectly well. Getting into top-down mode couldn't be more straightforward: you keep your finger on the console button and down it goes, and the tonneau cover lives in a bag in the front

compartment. 'The first owner died, and for some reason the car was sold without the hard top so that's not in the picture any longer.'

The two obvious aspects about its presentation are the front splitter and Turbo 2 rear spoiler. The story is that the original owner had the big wing fitted, then realised it didn't handle very well so the additional front splitter was applied to address that. 'The big wing seriously unbalanced it, so at 90mph it was unstable on the road. It wasn't an uncommon mistake: back in the '80s; people liked the look of the Turbo tea-tray and they were putting those big rear wings on, but not putting that little lip spoiler on the front that the SC has. It's only an inch-and-a-half deep, but it makes a lot of difference, it just glues the front of the car to the road at speed, and the spoiler that they've fitted does the business.' There's actually nothing underneath the Turbo 2 rear wing, as of course it doesn't have an intercooler. At any rate, the aerodynamic solution makes the car look very distinctive, and this blend of aero, big wheels and metallic paint are what constitute the enhanced image of this 964 Cab. Rag-roof lowered, I relish the fresh air up here on the moor.

The exhaust note is a fantastic throaty boom, the gearshift a perfect G50 motion, very precise, a lever that goes where you want it to go. It's running beautifully, and all the controls are tight with crisp operation, like a low-miles 964, which suggests it's been well looked after. It feels perfectly well planted on the road as I scoot around the corners for our lensman's benefit, a fine car, and typical of the quality of care purveyed by SCS. Back at the farmstead, a cassis tipple in its honour would be nice, but we'll take the coffee for now, thanks.



This nicely upgraded 964 Carrera 4 Cabrio is a great example of the sort of work that SCS turns out for customers

GT2 gearbox rebuild is the result of a previous rebuild gone wrong at another specialist, when a vital shim was left out. Perhaps not surprising when there are 22 to choose from. Fortunately SCS have the tools and manuals needed



undertake rebuilds of air-cooled and watercooled flat-sixes, and both manual and Tiptronic gearboxes, and their modern garage premises contains all the latest diagnostic tools including a Bosch Hammer, the 3D 4-wheel laser alignment 1 apparatus, and the PiWis tester. They'll also fit performance upgrades to order, ranging from stainless-steel sports exhausts, sport catalytic converters, short-shift kits and high-flow air-filters, to SuperPro suspension bushes and sports suspension kits. 'Some jobs probably suit Andy better and some suit me better,' says Stuart. 'Andy's the guy for the earlier stuff, so if it's an air-cooled he will probably jump on that, whereas I will probably jump on a Cayenne. I'm sorting that GT2's gearbox fault at the moment, so I'll more likely tackle a modern engine or gearbox. The GT2 gearbox is quite an involved job; someone rebuilt it in Holland with a secondhand casing and left one of the shims out, so we've got to calculate which shim should be in there, and there are 22 different shim sizes to choose from!'

Fortunately we already have the tool to set all the distances up, and we've got all the manuals with all the specs and calculations, too. We've done other gearboxes recently – a 996 Turbo that was jumping out of second gear, plus GT3 gearboxes; and I did a full engine rebuild last summer on a Turbo S where the shaft bolts had come loose, which is quite unusual.'

work for them and look after their package. We've got a trimmer just down the road who does our convertible roofs, rear windows for Boxsters, and all our leather work.' Amongst their mechanical services they also offer watercooled owners concerned about IMS bearing failure the peace of mind that comes with the LN Engineering IMS retrofit kit. 'This is a cost

“ The GT2 'box is quite an involved job, but we've got all the manuals ”

They've a pristine 993 C2 that serves as their show car. Andy is very proud of it: 'We had the wheels refurbed, different suspension, different exhaust, sports suspension, the valet re-did the leather, and we use it as a demonstrator to show our customers what we can do, and how the team we've got here will do the

effective option compared to the cost of an engine rebuild, and a valid precautionary measure,' says Stuart.

Seems like they have all bases covered. So, if you're passing by, or you're living in the south west and looking for someone competent to maintain your Porsche, it's worth looking in at SCS. PW



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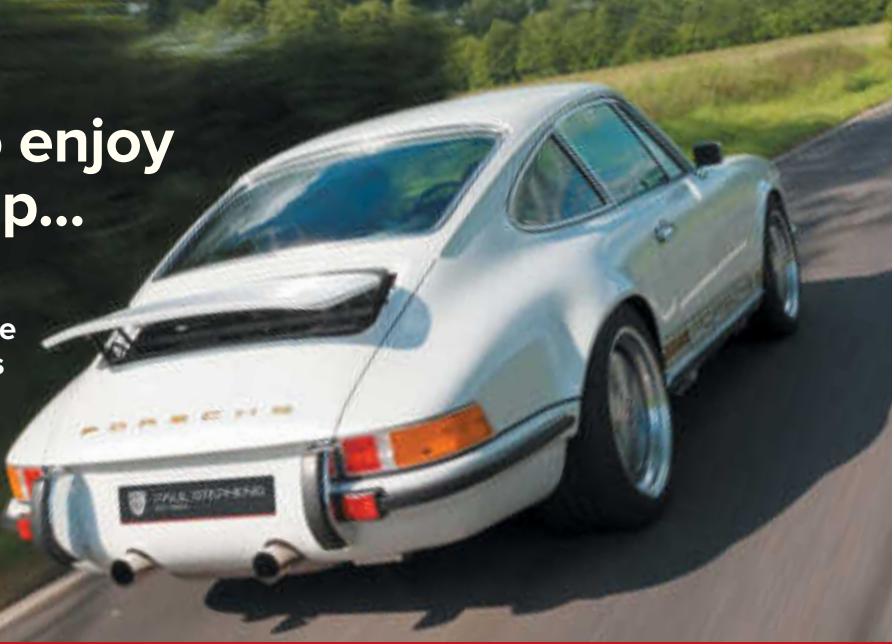


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THE TEAM

STEVE BENNETT

996 C2/944 LUX

The worldwide 996 Bilstein damper shortage continues to bite – well, it does for me anyway!

Consequently 996 has been languishing in the garage. The 944? Er, pass. Surely some news on both next month.



KEITH SEUME

912/6 'EL CHUCHO'

After a day spent on the rolling road, El Chicho now pushes out a cool 205bhp and 168lb ft of torque! Needless to say, we're pretty happy with the result. Now it's time to start enjoying the car before winter sets in.

CHRIS HORTON

924S, 944

A result on the 944 clutch hose – from F1 people ATEC at Silverstone – and I've found both a fluid reservoir and a tool for checking the injector pulses. So we could be going for an engine start soon!



PETER SIMPSON

CARRERA 3.4 TARGA

Still working away on both cars. Got lots to do and with the weather changing it's not as fun!



BRETT FRASER

BOXSTER 3.2S

I'd always thought that commuting in the Boxster would be a waste of its talents, but after a fortnight of daily 200-mile round trips, I've discovered that it makes the journey rather more interesting.

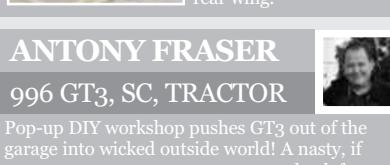


JOHNNY TIPLER

BOXSTER 986/996 C2

As you can see opposite, horses and cars don't mix too well and the Boxster has been biffed.

Ouch! Elsewhere, the quest to 'hot-rod' my 996 has resulted in the fitment of a GT3 style rear wing.



ANTONY FRASER

996 GT3, SC, TRACTOR

Pop-up DIY workshop pushes GT3 out of the garage into wicked outside world! A nasty, if temporary, shock for the old girl, but it does mean regular little blats on some fun local roads, to keep the battery fit.

HORSEPLAY

A gentle countryside jaunt sees Mrs T's Boxster 550 Spyder Anniversary saddled with the imprint of a horse's arse. Plus, the 996 gets a wing



Temperamental beasts, horses. Always slow right down and give them a wide berth, right? As we found out last month, that's not necessarily enough to avoid a good shoeing, or, in this case, a good bumming. Ooops, sorry Mrs! It was the nag what done it...

Here's what happened: we were on a single-track country lane about a mile from home one Saturday afternoon, minded to take a leisurely pootle up to the north Norfolk coast. We were in so little hurry that I'd already pulled over to let a Volvo SUV past. Up ahead on the brow of a hill the Volvo's brake lights came on, and as we drew closer we could see that an equestrian scenario had paused him while the steed was moved into a field gate to allow him by. There was a rider in appropriate clobber astride the animal, and it was being led by a woman in a high-viz vest on which I later read the legend "Young horse under instruction", or some-such. However, instead of waiting for us to pass, the mount was led back into the lane, so we halted the Boxster to see what would happen. After clopping perhaps 25 metres the horse was moved onto the narrow strip of grass at the roadside, and high-viz vest woman beckoned us on. I eased forwards at snail's pace, acutely aware there were just inches to spare. As we passed the horse, it shied and I was aware of a sickening thud as it made contact with the car. The woman cried out – the horse had also stood on her foot – and she shouted, 'hey, it's dented your car!'

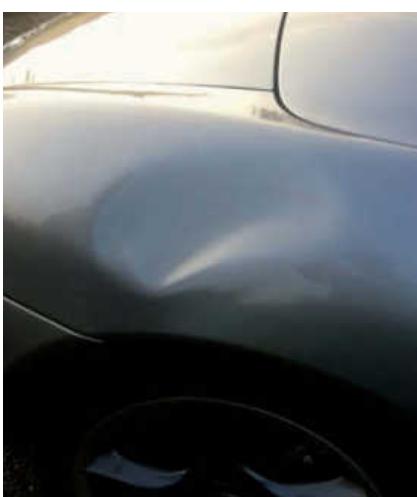
I drove very slowly down the lane till I found a place wide enough to stop the car, warning a neighbour coming in the opposite direction to watch out, too. Deflated, I surveyed the Boxster's offside rear wing, which all too clearly bore a dent corresponding with the size and shape of a horse's backside. The high-viz woman walked up to us, and I recognised her. She apologised profusely for the horse's behaviour and declared that she would pay

for the damage on her equine insurance.

I don't want to stirrup trouble, and I'm not going to bridle at the estimate to mend the car; it just means I'll have to rein in our outings till it's fixed. I have a quote from Paul Stephens' bodyshop to repair the damage for £1050; it's not just dented the wing, the metal is creased, too, and it promises to be a difficult job matching up the wing with the surrounding panelwork in the particular shade of Carrera GT silver. The mane thing is, it will be sorted on the horse's insurance – though, as I write, it appears that my own broker, Adrian Flux, will be making a claim against the equestrian policy on my behalf.

It's all very well sporting a high-viz vest stating that the horse is under instruction, but taking it onto a public highway, never mind that it's wearing a head-collar, is asking for trouble. At any rate, it's a young horse and hi-viz woman and the rider didn't have it adequately under control. The moral seems to be, don't slow down that much when passing a horse, so it doesn't have time to make contact with your car. I'll filly (*Groan – Ed*) you in on progress in the next issue.

It wasn't a clear-cut choice, getting Pig Energy be-winged. For starters, the simple



JOHNNY TIPLER

996 C2,
BOXSTER S

Occupation:
Freelance writer,
author

**Previous
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Carrera 3.2, 964 C2
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This month:
A bit of horseplay
for the Boxster and
more cosmetic
enhancements for
the 996

Well, that's not
going to polish out!
Clear evidence of
altercation with
horse's backside.
A tricky repair will
now ensue



JT's new GT3 wing being prepped prior to fitting at Norfolk Premier Coachworks. Not the work of a moment, when it comes to meeting their exacting standards.

Below: The end result

rounded contours of the 996's unadorned rear quarters are perfectly pleasant, aesthetically, till the electric spoiler deploys at 75mph. But there needed to be a match with the newly-fitted Carrera Cup style front panel, so it then became a question of what design and profile of rear-end aerodynamic extension would look best, given that I wasn't bent on imitating any hot 911 in particular.

The wider I cast the net, the greater seemed the potential cost, which restricted the final option to a certain extent. Having endowed the 964 Peppermint Pig with a ducktail, there seemed to be no good reason not to steer my 996 Pig Energy down that route, too, especially when we find the doyen of fast 911s, Alois Ruf, no less, fitting ducktails on his supercars and being perfectly content with the downforce created. Like all Ruf-made kit, his ducktail would have been very well made – but expensive. I examined the carbon fibre ducktail made by RPM Technik for their CSR Retro, a lovely piece of kit but again, more than I could stump up for. Ditto Getty Design in the USA. Both Porscheshop and Design 911 offered some attractive GT3 Gen 2 style rear wings that would have been contemporary with the age of my car. But here's the thing; I can now reveal that I have long held a sneaking admiration for the gorgeous compound curves of the swan-neck wing that adorns the 996 Gen 1 GT3 – for god's sake don't tell Antony Fraser – and what's more, despite its complexity, the glassfibre version is slightly cheaper than an average ducktail. My mind was made up. Ian Heward at Porscheshop came up trumps, and dispatched a swan-neck wing complete with 996 C2 engine-lid to my bodyshop, Norwich-based Norfolk

Premier Coachworks.

Now the serious business kicked in. The wing had been slightly damaged in transit, so that needed fixing, but all the surfaces bore ripples that required smoothing. First of all, though, head body-man Wayne needed to see how well the new engine lid fitted the 996's engine bay aperture. Off came the old lid, complete with its retractable wing, and with hinges and catch swapped over, the new lid with its integral wing took its place. You want diligence? Here is due diligence in action! Where the panel gaps were uneven, Wayne and his boys modified the new lid accordingly. It was then re-fitted and checked for alignment, removed and fine-tuned, and put back on once more. Once they were happy that it was completely flush, off it came again and the laborious task of fettling, filling, sanding and honing the wing and its swan-neck supports was carried out on workbench and trestles. Next, a primer guide coat was sprayed on before block sanding. This highlighted any remaining imperfections in the primer, and any such blemishes were attended to. After sanding, the wing and attendant lid were cleaned up with degreaser, and the complete assembly primed with a fine surface coat of Arctic Silver. Luckily Wayne had enough paint left over from when they painted and fitted the front panel a few months ago. When it had been prepped and block sanded, the wing and engine-lid were ready for the topcoat, with a final blow-down and a thorough degrease. The assembly was mounted on a panel stand in the paint booth, wiped down, and the first Arctic Silver topcoat was applied. Two more layers of basecoat were sprayed on, followed by a fourth and final

drop-coat to even out the metallic content. Then came a 15-minute flash-off in the oven, after which the painter applied the first clear-coat, followed by a last full wet-coat to finish off with. After flash-off, the wing-and-lid unit was baked in the oven for 40-minutes at 65-degrees C. He let it cool down, then flattened out any tiny imperfections in the clear-coat with 1500-grade wet-and-dry paper. It was then polished back until all scratches were eliminated. The final act was to adhere the black-painted 'gurney strip' on the lower wing section. It was a tricky operation to get it exactly right, but it finished off the whole ensemble beautifully.

As with the car's front panel, the engine lid also contains two air intakes, and whilst Wayne was able to clad the ones in the front panel with the mesh supplied, the rear lid's apertures proved inaccessible from underneath. So there are still two cavities that need closing off with appropriate mesh panels to keep the autumn leaves out. That said, the wing looks absolutely awesome and suits the car down to the ground. Well, that's its function after all, to provide downforce, which it did admirably well at the high speeds experienced on my recent outing to Abbeville circuit in northern France. I revel in nocturnal outings where the central rear brake light illuminates the wing, too. One small side issue: the car still thought it should be launching and retracting its electric rear wing, issuing a red warning light when no wing issued forth, so engine man Lewis at Paul Stephens dissuaded it from doing so by blanking off the contacts. To badge or not to badge? I think probably not. Though I might talk to Rick at Highgate House Graphics to see what he can conjure up. PW

CONTACT

Norfolk Premier Coachworks

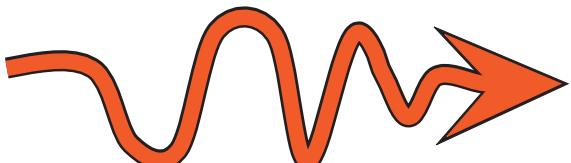
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968 ENTERS THE MODERN WORLD

Ken Coad adds 21st century communications to his 968, improves performance with a Promax chip and replaces the power steering pump



I shared the driving of a friend's 968 Sport on the RAC MSA two-day Classic Rally, great fun and an opportunity to appraise someone else's similar car. The event was over 350/400 miles in Wales, with visits to a race circuit and hill climb. First impressions were how much better his 968 accelerated and had more torque in higher gears, all attributed to the Promax Motorsport chip in the ECU.

So, no surprises, within days I was at the Promax workshop in Buckinghamshire. They removed the carpet forward of the passenger seat, revealed the ECU box of tricks and within seconds had the chip out. Surprisingly, perhaps, it wasn't original. Promax reckoned it was seven or eight years old and could be a racing version. Given its unknown provenance, I was even keener to fit the Promax chip, which at just £100 seems to be something of a bargain.

The performance gain was immediate. I have never ceased to be amazed how much extra oomph can be achieved simply by fitting a better chip. It's a changed car, no acceleration hesitation, 60mph in third, floor it to 90mph and it's instant, almost

unbelievable. I wonder whether the chip that Promax pulled out was holding it back. Anyway, I'm impressed, and to maintain this performance I use Shell Super V 98 octane fuel.

The annual filter and oil change of Millers engine and gearbox oil has come around again using CFS 5W/40NT racing engine oil and SAE synth gear oil. JZM sorted that, and fitted a replacement thermostat in the cooling system. I had noticed the fan was taking a while in heavy traffic to start cooling the radiator, so just a precaution. For good measure I changed the spark plugs to NGK BP6ES, as recommended by Alex Eacock at EMC Motorsport. It all helps to gain maximum performance.

Annual mileage is between 3500 and 4000 miles. I don't stint on using the car, it just gets better with all these small improvements making it more enjoyable to drive.

Next up was a long overdue job to try and fix the irritating steering groan. It's been there since I bought the car, and while various specialists have come up with ideas, so far none have cured it. I looked at having the power steering pump

reconditioned by Power Steering Services of Greenwich, but it proved to be too badly worn. So was that the culprit? My alternative, then, was to buy a new one from Porsche costing just over £500, and that included PCGB member discount. Within two days I had the new pump and JZM were entrusted to replace it. The result? Not that much better, sadly. I have failed to identify what makes the noise so it looks like I may have to live with it.

Against my better judgement of only spending on mechanicals, I have indulged, at great expense, in a Porsche Classic Radio Navigation System.

It was a wet, cold and miserable day at the Silverstone Classic race meeting in July, and I sought refuge on the Porsche stand and was attracted to the new high tech radio/sat nav on display, which does everything in a modern way, but looks the part in a classic style. As the title suggests, it replaces the radio with a digital version and has a built-in sat nav, too. It seemed a useful piece of kit to have on board a twenty-year-old car, so I bought one!

Features include Bluetooth and an all singing and dancing sat nav. It plays pre-

Ken's 968 Club Sport looking its usual pristine self

KEN COAD 968 CLUB SPORT

Occupation:
Marketing consultant (retired)

Previous Porsches: Three Current Porsches:

968 Club Sport/
924 S

Mods/options:
KW coilover suspension, Promax chip

Contact:
coadspeed@btinternet.com

This month:
Chip, power steering and Porsche sat nav system



recorded music off a memory stick, plus I could plug in an iPod. Typical German efficiency in other words. The installation was carried out by Jon Channer, of Solo Installation Services based near Tring, for a very reasonable £50. The unit replaces the radio in the centre console, uses existing front door speakers. A small box GPS signal type aerial is attached to the dash top near where the licence holder used to reside and a microphone for Bluetooth

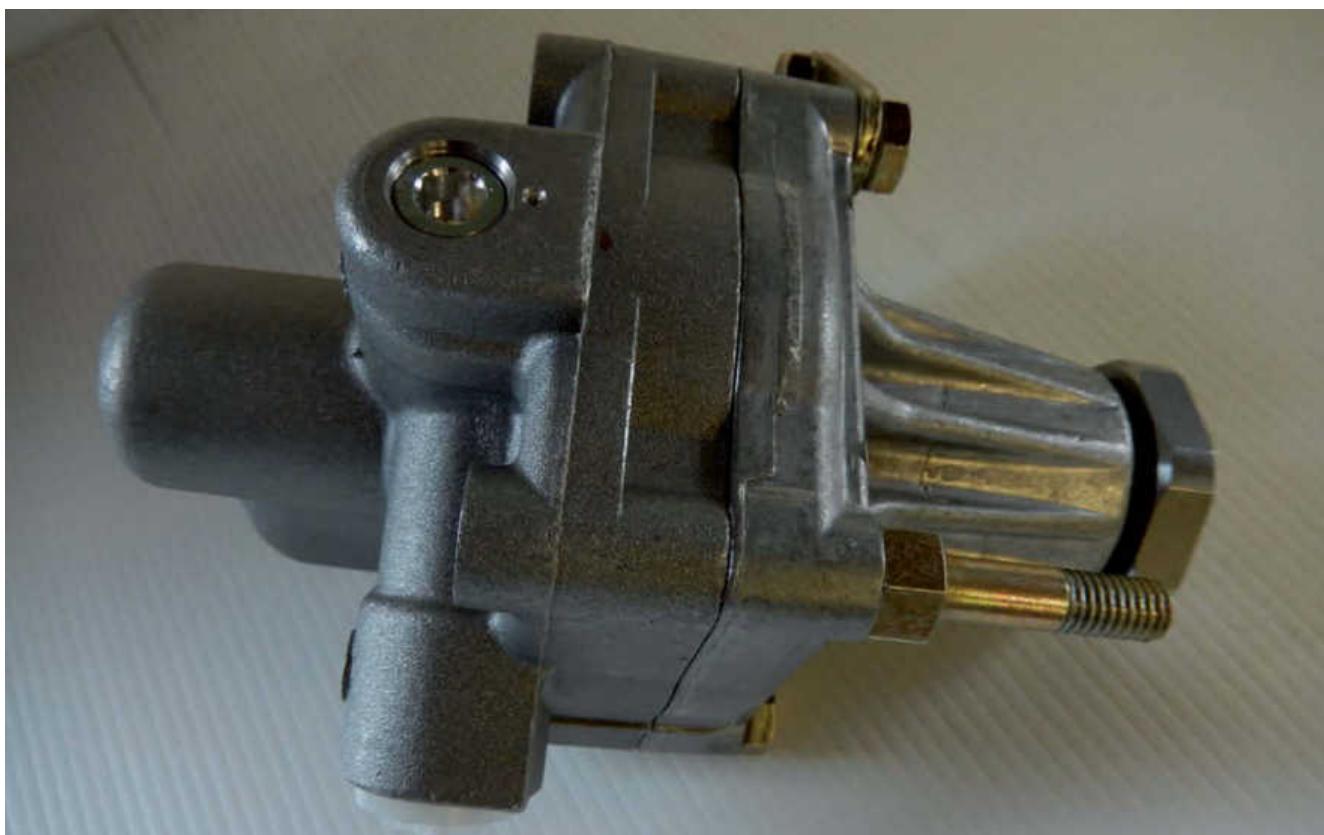
positioned near the driver's sun visor.

Two Porsche manuals came with the kit, which don't make easy reading. Slowly understanding the sat nav system, eg changing from kilometres to miles etc, this electronic age catches me out occasionally. Fortunately a technician at Porsche Centre Hatfield helped with fine tuning, especially finding the voice instructions in English. It is a serious bit of kit though and intuitive enough now that I've sussed it all out. It

looks good and blends in well, too, and now the 968 doesn't quite feel its age from a technology point of view.

So now I'm looking forward to my next trip to Europe using my Porsche satnav, and SANEF toll transponder in France, which beats delays at toll booths, automatically opens barriers, no messing with money, direct debit. How easy is that? The wow factor is there... And I won't get lost (famous last words)! PW

New Porsche Classic sat nav/radio etc looks the part and is suitably retro, fitting well with the 968's interior. Will play music via iPod and memory stick



Original power steering pump was too worn to be repaired, so a new one was fitted, but it didn't address the steering groan, which has plagued the car since Ken bought it

CONTACT
Promax,
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PETER SIMPSON

911 3.4 & 2.7

Occupation:

Studio Manager, CH Publications

Previous Porsches:

996 C4, 944S2

Current Porsches:

911 2.4T, 3.2 Carrera

Mods/options:

Plenty, but they're all coming off

Contact:

pete@chpltd.com

This month:

A whole pile of bits including wheels and engine parts to create a twin-plug 2.7-litre engine

The Targa as last seen, arriving at the Longcross test track for a photo shoot, stripped and ready for panel work to commence

I'm moving on with Project Old. At present all the bastardised panels have been removed and all the Dansk replacement panels have arrived safely from Denmark. The inner wings have been stripped back to reveal very little corrosion. I reckon this was down to the amount of sealer the car has had over the years, which has saved the shell from rotting through. It looks like it was well looked after once, and then, when it came to Britain, it was transformed into a monster! I've been collecting parts

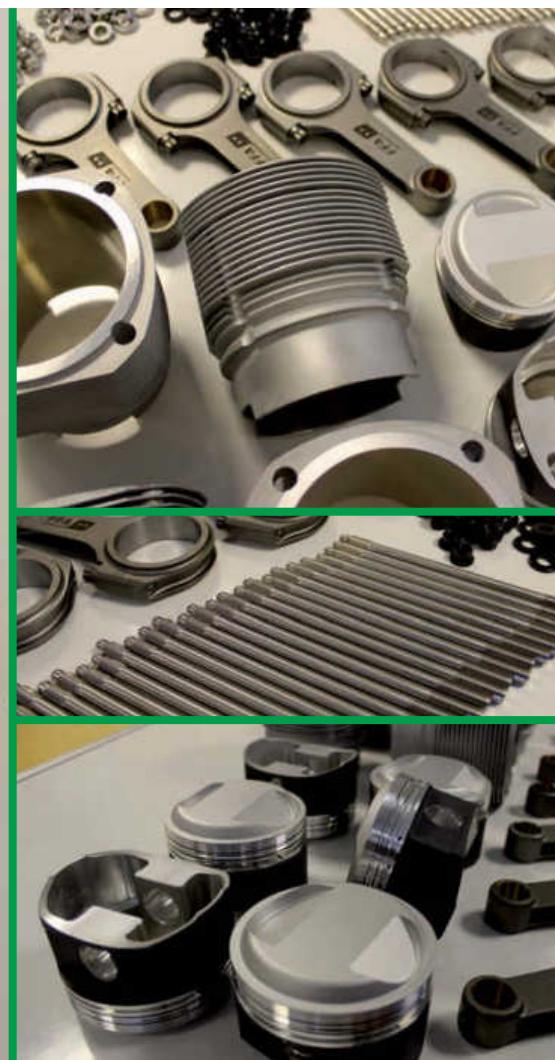
and, as you can see, I've got quite a pile together. Firstly, I wanted to try and get some Fuchs wheels back on the project. After hunting around for some pre '73 jobs, and checking prices everywhere, £500 per wheel seems to be the going rate these days. OK, so that's not terrible, but it's probably not the right thing to do here, as I'm not going for a concours/original '73 spec Porsche. I want something a bit different and, although looking standardish, this car needs to be slammed. Which is why I've gone for these beautifully made Braid

BZ wheels. They are super light and made to competition specification, so not some dodgy wheel that will bend on the first speed bump. I wanted them to be a little wider all round, too, but not so they stick out, so I've gone for 7x15 all round. These have been wrapped in some lovely 195/50x15 Yokohama tyres, which suit the size perfectly and were fitted at Top Marks tyres in Coulsdon, Surrey.

I've also been getting together some special engine parts – I'm going all out to build a strong 2.7 for the car. I've got myself

Braid BZ alloys in the desired 7x15in size with the standard offset and a set of 195/50x15 Yokohama tyres





a set of JE pistons, which have had thermal barrier coatings on the crown and anti-friction coatings on the skirt. They have had contact reduction grooves put in and run a CR of 10.5:1, so perfect for a decent twin-spark set up. Which is exactly what I've received from EBS Racing in America. They've sent me through a complete twin-spark system. This is a major part of the engine rebuild and will give that extra rev-range for some much needed power from the 2.7.

I just need twin-plug heads now!

L&N Engineering, along with Fast Forward have supplied me with a set of coated cylinders to house the JE pistons, along with a set of rods and some coated bearings – more details on both very soon. This engine, of course, will be held together with ARP studs and bolts. Sitting on top of this lot will be a pair of rebuilt triple Webers. Power? Well, it's got to be around 250bhp. Ooh, sounds like fighting talk! **PW**

CONTACT

Braid
braid.com
The awesome 7x15 BZ wheels

JE
jepistons.com
Coated 10.5:1 pistons

Dansk
jpgroup.dk
Pre '73 panels all round

EBS
ebsracing.com
Twin-spark system

LN Engineering
lnengineering.com
Fast Forward
fastforward-automotive.com
Cylinders, rods and bearings

Car Parts 911
carparts911.co.uk

EBC
ebcbrakesdirect.com

Rennline
rennline.com

ARP
arp-bolts.com

EBS twin-spark kit along with L&N cylinders, rods, ARP studs and a set of JE pistons

The Braid BZ lightweight alloys being fitted up with Yokohama tyres



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Welcome to *911 & Porsche World's* Q&A pages, edited and assembled by the magazine's technical man and do-it-yourselfer, Chris Horton (above). The format is much as you would expect – you ask, and our experts do their best to offer a practicable, real-world solution – but we also pass on some of the knowledge that we gain during the course of our own work on the magazine and our cars. Either way, we routinely add as much detail as possible – including part numbers and costs, contact and website details, and any relevant illustrations that we can find. Prices quoted are to the best of our knowledge correct – for the UK market – at the time of writing, and generally exclude VAT unless otherwise stated. Naturally we do our very best to ensure that the advice and information given is accurate, but we can accept no responsibility for any effects arising from it.

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PERFORMING SEALS – OR MORE PROBABLY NOT

Here, by way of a slight change, is something of a rhetorical question from me to you, the many readers of *911 & Porsche World*.

Because I would genuinely like to hear any plausible and workable solutions that the more inventive of you might have come up with.

You have a 944 of some description. Or a 924, a 924S, or even 968; in the context that follows they are all exactly the same. The main tailgate seal is in poor condition, and partially flattened at its top corners – and it is certainly leaking rainwater and probably exhaust fumes – so as a conscientious and caring owner you buy a brand-new one, direct from Porsche, and thus 100 per cent genuine. (And, at around £70 including VAT, not overly expensive, either.)

Time was, about a decade ago, when unlike (slightly) cheaper after-market alternatives it would have come as a continuous loop, the two ends permanently joined at whatever factory whence it originated. Obviously that would mean disconnecting both the tailgate struts and the wiring for the heated rear window in order to install it but, having done so, at least you were saved the irksome task of

first neatly cutting the extrusion to exactly the right length, and then joining the two ends in such a way that they would be watertight.

Today, however, it seems that all you get is a roughly 4.25-metre length of the appropriate extrusion, presumably simply cut more or less to length from a long roll of the stuff, and chucked into a plastic bag – and no less obviously with all of the inherent drawbacks avoided in the scenario in the paragraph above. Where, however, do you begin the fitting procedure? And then, arguably still more important, where do you position the join (which is designed to be reinforced internally with a short length of rubber tubing; see the photo below right)?

Simple logic – and Porsche's own previous practice on every relevant model that I have looked at – suggests in the middle of the lower run across the rear of the car. And that is precisely how I did it on my own 944 a few weeks ago, gently tapping the 'U'-section backing moulding (packed with a gooey white sealant; make sure that it doesn't squeeze out all over the shop) over the flange on the body shell with a rubber mallet, and naturally making sure that I wasn't 'cutting



Horton changed his 944's tailgate seal, primarily because the old one had become completely flattened at its top corners – but this was the new one after only a few days. Was it worth the effort and expense?

corners'. (Which is all too easily done, and obviously likely to be the source of further water and fume leaks.) Needless to say, I nearly cocked up cutting it to length, and I haven't yet finally glued the two ends together, but it looked OK, and I was reasonably satisfied with the result.

For a while, anyway. A few hours later I went back outside to admire my handiwork, and discovered, to my disappointment and perhaps consternation, that even then the new seal had become just about as flattened along its top edge as had been the old one. It recovered very slightly when I pinched it round again with

my fingers, but unsurprisingly by the following morning it had taken on a more or less permanent 'set'.

I put it down to the inevitable reduction in overall quality that afflicts just about every aspect of our lives, and resolved simply to live with it. But then, by running my fingers around the rest of the seal to lubricate it with a very thin smear of Vaseline, I realised that in two areas there are what feel like further lengths of that smaller-diameter rubber tube inside the main outer one, presumably to offer additional resistance to squashing, and thereby offer a better seal. With the join at the bottom, however, those sections end

up at the rear corners of the cargo area (see photo below left), and while that certainly won't do any harm, it doesn't seem either particularly necessary or useful.

Position the join at the top, however, and the reinforced sections would seem to be just about ideally positioned to beef up the seal at the two points where, in my opinion and experience, it is probably needed the most. Anyone? I shall be trying the latter approach when I install the second of the two seals that I bought on the 924S, but in the meantime answers on the proverbial postcard, please – or better still by e-mail to the address at the top of this page.



Place the join between the two ends of the new extrusion at the bottom of the aperture in the body, as logic suggests (right), and what are then the lower rear corners of the seal contain what feel like internal strengtheners. But surely these would be more use at the top? It's a great shame, too, that the seal no longer comes as a single continuous loop

997 REV-BAND RECORDS

Q

Encouraged by your annual round-up of sub-£25,000

Porsches in the September edition of the magazine, I am shortly going to treat myself to my first 911 – most likely a 2006-model 997 Carrera 'S'. I was lucky enough to have a 968 as a company car back in the 1990s, and before that a Carrera 3.2.

Unlike what appears to be the vast majority of people who own these cars, as an engineer by training I am not overly concerned about either RMS leaks or possible IMS bearing failures – the former are arguably inevitable, to some extent, and the latter probably avoidable by correct maintenance – but I would like to be able to assess how the engine might have been treated during its life.

I understand that the management system can be 'interrogated', to show how many times it has been run within certain rev ranges, and thus whether it may even have been over-revved. Is this correct, and if so how do I go about accessing this information?

Harry Lewin, Hampshire

A Chris Horton, 911 & Porsche World:

Yes, a good independent

specialist (or a Porsche Centre), armed with the appropriate system tester, can give you quite a lot of revealing detail about the power unit's past life, including the number of ignition 'events' within certain higher-speed ranges, and also the engine hours at which the most recent of those took place.

You can also read the total engine hours, and this is itself quite a useful way of working out the vehicle's likely average road speed over the course of its life, and thus a broad indication of the way it has been driven. Interestingly, the vast majority of vehicles, from a Boxster 2.5 right up to a 997 Turbo, will in that context show an overall average of

around 30–40mph. A big discrepancy from this kind of figure might call into question the car's likely treatment, but also the accuracy of its odometer reading, of course.

My colleague Paul Stacey at Northway Porsche kindly did some research on 997 rev bands for me, and although it seems that not even his own Porsche Centre contacts could quote definitive figures, he did some further digging on-line and came up with the information shown below. The point being, of course, not what the precise numbers might or might not be, but what those different bands mean as far as the engine's overall health is concerned, and any subsequent action that might thus be required.

Range 1: 6800–7000rpm
 Range 2: 7000–7200rpm
 Range 3: 7200–7400rpm
 Range 4: 7400–7900rpm
 Range 5: 7900–9000rpm
 Range 6: Over 9000rpm

'A Porsche Centre would not be concerned by any "incursions" into Ranges 1 or 2,' suggested Paul. 'Ranges 3 and 4 would require both compression and cylinder-leakage tests – assuming that the engine has reliably covered at least 200 operating hours since the last time it was in the higher rev range. Anything in Ranges 5 and 6, which could suggest that the engine has been "buzzed" by a missed [manual] gear shift, and regardless of how long ago it took place, would require an engine rebuild for them to offer any form of warranty on the car.'

There is a similar protocol for the 996 and 986. 'Range 1 is anything up to the rev-limiter within the engine management system, and Range 2 anything over that figure, and which again – unless it has happened many times – would be an indication that someone has missed a gear. In all cases, of course, it is going to be much harder to over-rev an engine mated to a Tiptronic or PDK transmission.'

(HAND) BRAKING BAD

Q

The handbrake in my 944S2 is becoming increasingly stiff to operate, to the point that when releasing it I now have to push it down quite firmly, rather than effectively letting it simply fall under its own weight, and the tension of the various springs built in to the mechanism. Can you offer any helpful advice please? I am fairly DIY-savvy, but ready to admit defeat and take the car to a specialist if necessary.

Derek Cox, Yorkshire

A

Chris Horton, 911 & Porsche World:

It is always possible that one or other of the two handbrake cables running beneath the floorpan has partially seized, but as a very simple first step I would suggest that you check the pivot mechanism within the lever inside the cabin. Prompted by your e-mail I had a look at my own long-dormant 944 project car, and immediately realised that (unsurprisingly) this, too, had a rather stiff handbrake lever. No, make that a very stiff handbrake lever. Has your Porsche stood unused for any significant period, like mine?

How to fix it? Take out the driver's seat to make it easier to access the handbrake – six M8 screws,

with either ordinary 13mm hex heads, or sockets for an Allen key. Watch your back: the seat will be very heavy, especially if, like the one in my car, it has electric adjustment. (I reckon mine must weigh the best part of 25–30kg. And this was meant to be a sports car, for goodness sake!)

Release the handbrake – obviously making absolutely sure that the vehicle cannot move, either by chocking one or more of the wheels and/or putting it in gear. (And do bear in mind, by the way, that my car, shown in the accompanying step-by-step photographs, is a left-hand-drive model.)

Gently peel back the carpet at the edge of the floorpan to expose the two M8 (13mm socket) screws attaching the lever to the bracket on the sill. Unscrew them, if necessary pulling the lever forward slightly to release any residual tension on them that could risk damaging the threads. (The screw at the front also secures the bracket for the handbrake warning-light switch.) Release the hook at the base of the handbrake lever from the main cable adjuster.

To test the action of the lever on the ratchet plate, push in the release button and, with your other hand, attempt to rotate the plate. Mine barely moved. To separate the plate from the lever in order to clean and lubricate them, undo the

13mm self-locking nut, and if necessary gently tap out the special bolt with a soft-faced copper hammer. (Even then the two components felt like they had been glued together.)

To avoid the danger of getting grease all over the carpets, I gave the ratchet plate from my car a quick spray of silicone from an aerosol can, before fitting it back into the base of the lever. I had to wiggle the release button about a bit to allow the locking pawl to assume the correct position, but you shouldn't have any great difficulty lining them up. Refit the pivot bolt and then the self-locking nut, tightening the latter just enough to secure it – but obviously not so tight that you risk squashing the lever tight against the ratchet plate.

To refit the complete lever, first slide the hook into the adjuster, then pull it forward again to allow the holes to line up with those on the bracket. Don't forget to refit the bracket for the warning-light switch, rotating it as necessary so that it operates correctly as you lift the lever. Refit the seats, being particularly careful that no dust or grit falls into the holes for the mounting screws and risks damaging the threads as you tighten them. Job done. Total time about half an hour, and so perhaps £35–£50 saved on specialist labour rates.



944's handbrake is a simple mechanism, easily removed and dismantled for lubrication. If you take out the seat, make sure that all fixing holes are undamaged – and use only the right screws to refit it

NEW AFTER-MARKET 911 CRANKCASES COULD SAVE THE DAY

QA few weeks ago I commissioned a full and what will without doubt be an expensive rebuild for the 2.2-litre engine in my 1969 911S. But I have now been informed that unfortunately the two apparently magnesium-alloy crankcase halves are probably damaged beyond repair – and certainly not without spending a considerable amount of money on them, even before starting on the rest of the power unit.

Briefly, several of the cylinder-head and barrel securing studs have pulled out of their threads (and one has broken off almost flush with the hole, leaving little to grab hold of), but worse than that is the extensive internal damage caused by someone previously – and very inexpertly – attempting to 'shuffle-pin' the two halves together. (I am not entirely sure what is meant by that terminology, but I believe it has something to do with preventing the two castings moving and thus fretting against each other at sustained high revs.) There are also signs that several of the main bearing shells have at some earlier time rotated within their locating webs inside the cases, and elsewhere some deep-seated corrosion on the outside surfaces of the metal. All in all, it's a bit of a mess.

My specialist has suggested trying to find either a pair of good second-hand crankcases from a car of roughly the same age and type, or another complete engine to act as a donor for mine, but my early research has shown that this is likely to cost at least £2500 for a pair of bare cases, and perhaps as much as £12,000 for a complete engine – and if I take the latter route I would obviously have no way of knowing whether that unit, too, is genuinely serviceable without first paying perhaps another £2000 for a full stripdown and inspection. Can you offer me any constructive advice, please?

Michael Ellis, Leicestershire

Chris Horton, 911 & Porsche World:

AIt's a tricky one, this, not least given the importance that so many enthusiasts for these earlier cars seem to attach (not always entirely logically, in my opinion) to so-called 'matching numbers' – or in other words retaining at all costs the engine originally fitted to the car at the Porsche factory. That sounds like it may already be impracticable in this instance, however, and since (I hope!) your primary aim is ultimately to drive and thereby enjoy your 911, I would advise a rather more drastic approach – but one which will in the longer term, I believe, add to both the vehicle's overall usability and thus also its value. Whatever may have been the material's merits at the time, or its historical appeal today, these early engines with magnesium-alloy crankcases have become, frankly, a bit of a liability.

All is not lost, however. Remarkably, Neil Bainbridge at BS Motorsport in Buckinghamshire

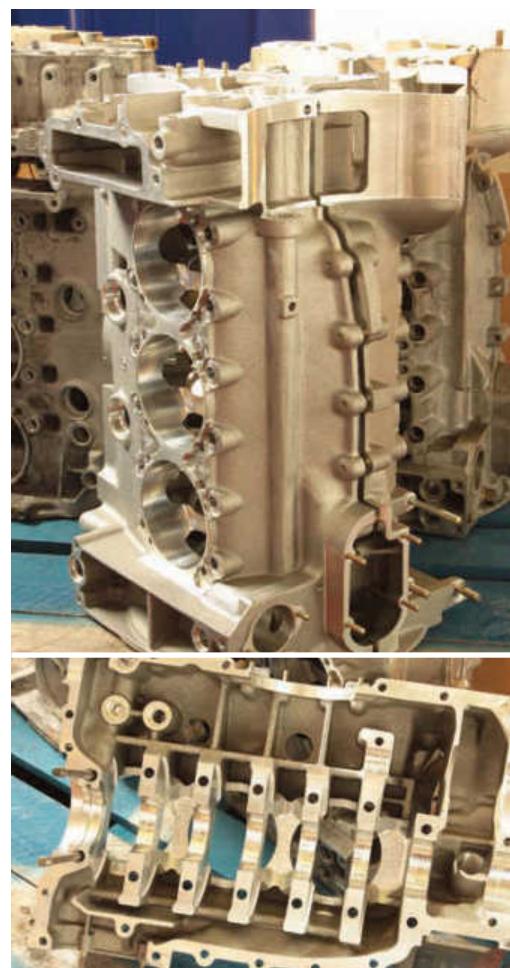
has recently taken delivery, from a relatively small manufacturer in Germany, one of the first pairs of 911 crankcases to be produced by an independent after-market supplier. It all started about five years ago, Neil tells me, over a beer or three with the company's proprietor one evening, and he has subsequently been involved every step of the way, advising and making suggestions as to precisely what was required. (And it is worth noting, by the way, that despite making a bit of a song and dance about still being able to supply brand-new 944 cylinder blocks – which only rarely cannot be reclaimed for a relatively modest cost – even Porsche itself no longer 'services', ie supplies, these air-cooled crankcases.)

Sand-cast using a modern, state-of-the-art aerospace-grade aluminium alloy, they were originally intended primarily for the more exotic 911s, such as your early 2.2-litre with its increasingly troublesome magnesium-alloy cases, as well as the 2.7 RS and the 3.0 RS/RSR, but also incorporate the most important of the many updates and improvements that Porsche itself made during the entire production life of the 'Mezger' engine. They are by definition suitable – or can be made so – for just about any air-cooled car up to and including the very last of the 993 Turbos.

They can be supplied to order with a wide variety of spacings for the cylinder-barrel spigots and the barrel/head studs, allowing for capacities up to 4.0 litres, and internally permit (for instance) the installation of the later, larger and thus more efficient oil pump. They also feature much stronger internal webbing than most original engines will have had. Discussing the matter with BS Motorsport's Neil Bainbridge, I likened them to the PMO carburettors that we featured in one of our how-to stories a couple of months back – which are plainly very closely based on the original Webers, but have been thoroughly re-engineered to iron out any now known shortcomings – and I'm pleased to say that he agreed wholeheartedly with the analogy.

These cases are by no means inexpensive, of course – circa 17,500 euros the pair plus VAT, in fact – and obviously not at all 'original' (whatever that hackneyed term actually means), but given what must have been the huge development and production costs, and the many updates and improvements that they incorporate, never mind the likely value of the consequently rejuvenated car itself, I think that is actually almost absurdly cheap. BS Motorsport, which is near Aylesbury in Buckinghamshire, will be happy to sell you (or your engine builder, of course) a pair, or for the appropriate additional fee to assemble a complete power unit around them. More details on 01296 658422, or go to www.bsmotorsport.co.uk.

You refer to shuffle-pinning, by the way. Your understanding is correct. It is a technique of very accurately boring precisely matching small holes in each crankcase half, either side of each main-



New air-cooled cases from BS Motorsport are a work of art – and even at nearly 20,000 euros a pair must have been a labour of love for the company that made them

bearing journal, such that dowels can be inserted in them to provide a more rigid connection between the two castings than would ever be available from the few standard Porsche dowels and the crankcase through-bolts. Needless to say, it has to be done 100 per cent correctly, or not at all. Get it wrong – as has previously happened in your existing engine – and you could have some very expensive scrap metal on your hands.

One last thought: whatever may be my own views on these so-called matching numbers, they are, as Neil rightly says, vitally important to the overall provenance of Porsches such as these. So while it may be impracticable in this situation to use your original crankcases (and I am assuming here that they are, indeed, the ones the vehicle started with), make sure that you keep them for possible inclusion if you ever sell the car.



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Porsche 911S 1975 Targa 3.0L 5-Speed Manual Gearbox, LHD, Silver with Black & Red Interior.

Porsche 911SC 1983 Coupe 3.0L 5-Speed Manual Gearbox, LHD, Silver Grey with Tan Interior.

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TECH: DETAILING

DETAILING SCIENCE: PART SIXTEEN

MATTE & SATIN FINISHES

TIME REQUIRED: TWO TO THREE HOURS

Matte finishes are currently very popular whether by means of a vinyl wrap, or paint. They are much harder to look after than normal gloss paint, and standard car care products can really play havoc. Here, then, is how to clean and look after a matte surface

Fashion affects the automotive world just as much as it does any other. Recently matte and satin effect finishes have grown in popularity. During WW2 matte paint was not so much a fashion as a necessity – at least for the purposes of camouflage. In the years of post-war recovery, with matte greens and greys being among the few colours available, the trend continued. With the 1950s and 1960s came a return to prosperity, and the development of acrylic coatings replaced the slow-drying enamels and quick-fading celluloses of old. Since then, bar the odd eccentric using blackboard paint for a sinister look, gloss has always remained in vogue.

Recently, perhaps in an effort to stand out, we have gone full circle. Hatchbacks to hypercars are breaking cover in matte and satin finishes. There are two ways these finishes can be achieved. Two years ago the most common was by means of a vinyl wrap, and since then manufacturers themselves have been offering matte and satin paint options from the factory. Thankfully the car-care industry has caught up, and there are a number of manufacturers offering specialised products from Nanolex, Angelwax, Scholl, Chemical Guys and Swissvax. While the cynic may regard this as an excuse to reinvent or simply re-badge existing products with an added premium, you only have to accidentally apply a gloss-enhancing shampoo to a priceless matte car once to realise they have been produced for a reason. Equally you should avoid hand car washes and automatic car washes even more than normal – few have training, let alone training in matte paint, and as many lack insurance, you will end up having to foot the bill when it goes wrong.

To appreciate why different products and techniques are required, we need to look at the science, if only briefly. Gloss is produced by having a perfectly smooth surface, which allows light to reflect in a consistent way. To this end detailers use machine polishers to flatten the microscopic peaks and troughs of a paint surface, or fill the troughs with waxes and glazes to create that mirror finish. In contrast, the matte and satin finishes have

rough surfaces engineered into them, reflecting and refracting light in all different directions to reduce gloss. Matte and satin finishes are technically the same, they are just at different points on the spectrum, with matte finishes having deeper peaks and troughs to lessen reflection beyond that of a satin finish.

Today, so many car-care products contain gloss enhancers of one sort or another. Car shampoo, for example, has silicone-like lubricants with some short-lived filling ability and these can add gloss. Many 'gloss-enhancing' shampoos claim to contain wax, and even those that do not make any such claims can have a disastrous effect on matte paint. If you accidentally spray tyre dressing on matte paint, again the silicone content will create a patchy gloss which will prove challenging to remove. When treating these specialist finishes, whether it is a wrap or paint, one has to be really careful.

Miles Marr of FX Detailing near Leicester demonstrates how we should wash and protect a satin black Panamera using his preferred arsenal of Swissvax 'Opaque' products. The first step is the pre-wash where the aim is to remove loose dirt and debris from the car without touching it. Normally one would be using snow foam, essentially a foaming degreasing detergent, but as with their non-foaming brethren, known collectively as 'TFRs'. However, snow foams can leave a patchy finish, so it's best simply to use water through a pressure washer. Remember to rinse from the roof down, and to pay particular attention to the rims, wheel-arches, and drain gutters.

The actual wash phase is similar to a conventional gloss car. Use three buckets: one for clean water with shampoo, in this case Swissvax Car Bath Opaque; one for rinsing your wash-mitt between panels; and one for cleaning the wheels. Work from the top of the car down, and rinse your wash-mitt as regularly as possible to prevent grit getting into it and scratching. With wrapped cars be really careful around the edges of the wrap, quality vinyl should not peel, but they are most vulnerable at the edges around the wheel-arches. Dry the car as soon as possible after washing to avoid water spotting. In hard water areas or on hot days, it may be worth washing and drying half the car at a time and



overlapping in the middle.

You can't polish matte finishes as it destroys the microscopic texture, turning your matte car into a patchy smorgasbord of sheen. A tailored, non-abrasive paint cleaner is the only option, and the Swissvax Opaque Paint Cleaner has been used by Miles to get the finish looking as good as possible. If you have less time, you can use a quick detailer such as Angelwax Luminosity Matte QED.

You may be surprised to hear that you can wax a matte or satin car, but again you need to use an appropriate product. Matte paint and wraps need protection just as much as conventional paint, and as you can't polish out faded matte paint it's more important than usual to ensure it has UV protection. Both Angelwax and Swissvax offer such waxes, the latter of which has been applied here, which should last at least three months in normal conditions. PW

Miles Marr of FX Detailing demonstrates the correct way to clean a car with a matte finish, and that is to simply use water before then using a matte appropriate shampoo followed by an appropriate wax or polish. Never use any cleaning, polishing or wax product, that's intended for normal gloss paint finishes

CONTACT:

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BUYERS' GUIDE: PORSCHE 944

FULL FRONTAL

Born from the 924, the 944 came with a 'proper' Porsche engine and was a massive hit in the '80s – and for good reason. Indeed, many saw it as the successor to the 911, particularly in Turbo form. Many were sold and many survive, good and bad. Prices are on the move, too. After some years in the wilderness the 944 is having its day, dragged up by ever spiralling classic Porsche prices. Here's what to look for

For many years the 944 has been the democratising force in Porsche ownership. While 911 generations are invariably either new and expensive, or classic and expensive, with a brief period in between when they approach affordability, the four-cylinder, water-cooled coupe (and convertible) built between 1982 and 1992 is the Porsche you can buy on a four-figure budget. Indeed, many have changed hands for three figures, although slightly strengthening values of late have left those a fond memory.

Why have 944s been so cheap? It wasn't because they were inexpensive new: in 1988, for example, the range-topping 944 Turbo SE (Special Equipment) cost around £41,250, which was over £4000 more than a 911 Carrera 3.2. Some said the 944 was beset with an irredeemable image problem, owing to its Volkswagen origins and assembly by Audi; others that, solidly engineered though it undoubtedly was, it simply could not compare with the fiery nature and sheer charisma of its rear-engined stablemate.

But over 23 years on from the last 944

being built, this is now historical debate. What really matters is the state of what you're going to find now, be it tucked away in the bargain basement section of the classified lineage or the showrooms of the classic Porsche specialists. Is the 944 the simpler alternative to an air-cooled 911, or is the distinctive red and gold coat of arms on the bonnet a warning that there is no such thing as a cheap Porsche once running costs are taken into account?

The 944, launched in "Lux" form in 1982, was derived from the 924 and was, perhaps, the car that the 924 should have been all along: its wider-track, flared-arch body was way more muscular and the "big banger" 2.5-litre four-cylinder engine with its 161bhp and 151lb ft torque delivered the mid-range punch that the 2.0-litre 924 failed to. The five-speed manual gearbox was, as on the 924, rear-mounted, with a three-speed automatic optional. The interior was largely that of the 924, but with new trim materials.

It wasn't long before the first tweaks came, much needed power-assisted steering made optionally available in August 1983, as was air conditioning, while a tilt was added to the (optional) electric sunroof. September 1984

saw PAS fitted as standard, and one year later a visual refresh saw the fitment of the five-hole "telephone dial" alloy wheels, a completely new instrument panel with a flat display rather than three sunken dials, and the addition of one or two treats such as electrically adjusted and heated door mirrors.

But the big news from Porsche in Autumn 1985 was the arrival of the 944 Turbo, to join the Lux. The addition of an intercooled KKK turbocharger along with advanced for the time Motronic management boosted output of the 2.5-litre engine to 217bhp and 243lb ft, this twisting force trashing Porsche's hitherto orchestrated output hierarchy by considerably exceeding the 911's torque. One year later, Porsche partook of the 16-valve fashion of the time, introducing the 944S, a normally aspirated model but with a 16-valve cylinder head, this halfway between the Lux and Turbo in power terms, with 187bhp and 170lb ft torque.

For the 1988 model year, in September 1987, the basic eight-valve 944 engine was re-engineered for lower emissions, and could now run unmodified on unleaded petrol. Power dropped by 3bhp, while torque rose 4lb ft to 155lb ft, but occurring 1500rpm

Variations on a theme. The Guards Red 944 Lux was probably the definitive '80s spec 944. The Turbo in the foreground featured a more aerodynamic nose. Both owe their existence to the 924



PRICE RANGE

£1000–£2500 The running but tatty 944s that used to be sub-£1000

£2500–£5000 The bracket in which most 944s are sold. Expect a sound engine and passable body

£5000–£7500 This money should command a reasonable 944 S2 or a Turbo. Mileage likely to be over 100,000

£7500–£10,000 Late, 1990–1992 cars with 75,000 miles or less, with sweet engine, no body rust, a good interior and full service history

£10,000–£15,000 In this bracket, excellence is required. Near pristine condition outside and in, under 50,000 miles and with detailed service history

BUYER'S CHECKLIST

Engine should not smoke under load

Cylinder-head gasket leaks quite common, can be tricky to spot
944 Turbo can suffer leaking turbo unit and fatigued wastegate
Engine bay wiring loom becomes baked hard with heat, and can fail

Inexact handling and clunks mean worn ball joints – far more expensive on "oval dash" cars

Brake calipers can partially seize and will need dismantling
Defective ECU airflow meter will cause engine flat spots

Rusty sills cost a lot to repair properly, may render the vehicle a write-off

On early "square dash" models, the dashboard can crack on the top



Interiors are well built and generally last well, but dash top can suffer from sun damage, particularly early 'square' dash cars. Engines are strong, too. Turbo engine – shown here – is a development of the 2.5-litre, 8-valve unit and gives up to 250bhp

higher at 4500rpm. But this motor was used for just one year, in September 1988 giving way to a 2.7-litre unit with 165bhp on tap. Shortly afterwards, the Turbo SE was added to the line up, featuring a 247bhp engine with external oil cooler, and uprated suspension and braking. The Turbo's normal 7Jx16-inch front wheels ran slightly wider, 225/55 tyres, while the rear rims were widened to nine-inches and wore 245/50 tyres.

If confusion had by now crept into the 944 range, it was cleared up in part in 1989 with the arrival of the 944S2, using a new 3.0-litre 16-valve engine (208bhp) to replace the 944 (the Lux name disappeared in mid 1987) and 944S. Cabriolets came late to the 944 range, in March 1989 in S2 form and in February 1991 to the Turbo.

HOW 944S DRIVE

Apart from a lack of power-steering in the early days, which made parking the Porker a real sweat, the handling was superb for the early 1980s, with a beautiful balance, the near neutral front/rear weight distribution a result of the rear-mounted gearbox (a layout already seen, of course, in the 924). It was lauded as the best handling road car in the world, and frankly was more composed than the still tail-happy 911 of that era.

The original 2.5-litre engine was likeable enough, but mainly for its strong mid range torque and tractability. The intoxicating howl of the 911's boxer six was absent.

The Turbo engine was among the first forced induction car engines that did not suffer noticeable turbo lag, before delivering the power in an unsettling rush. It spooled up early and quickly making the car feel immensely torquey, and much more "civilised" than the 911 Turbo. The first, 2.5-litre 16-valve engine was not a success, however, suffering the lack of mid range torque common to other multi-valvers of the mid 1980s, for example the VW Golf GTi 16v.

The interior is one more aspect in which the 944 contrasts so completely with the 911. The instruments and switchgear are laid out in an orderly fashion, and you have normal heating and ventilation (although this isn't terribly good on pre-1985 facelift cars), benefits an air-cooled 911 could not claim to offer. The driving position is good, and despite the remote position of the gearbox the gearshift is positive. But the whole interior is understated and not sufficiently distanced in style from the in-house VW/Audi look of the time, it's felt.

944s were always offered with a wide range of optional extras. A set of 16- rather

than 15-inch alloy wheels (16s were standard on the Turbo) could be specified, or even just lower profile tyres (215/60s instead of 195/65s) on the normal 15-inch rims. Sport suspension was available, while the Sport shock absorbers that were part of that package could be fitted alone. A limited-slip differential was offered for all manual models. Inside, the choice of options was equally wide, including part or full leather seating, leather for the dash, standard or sports seats, with or without heating and electrical adjustment. Even a non-tinted front screen could be ordered, at no extra cost.

WHAT YOU'LL PAY

It says a lot for the regard in which 944s are held that the top prices asked for them are generally what you'd pay for the shabbiest and cheapest air-cooled 911s, around £15,000. If you are prepared to stretch that far, you should expect almost a time warp car with under 75,000 miles. 'Prices have edged up recently,' comments Terry Perry at Uxbridge-based Porsche specialist 911 Virgin. 'Prices for good ones are now well over £10,000, which you wouldn't have seen a year or two ago.'

The very cheap cars appear to be more scarce now, and, if asking prices in the classifieds are converted into selling prices, most of the activity is between £2500 and £5000. The two most sought after models are late Turbos (the Turbo SE has always been a rare sight), and last of the normally aspirated cars, the 944S2. But whatever your

budget, Perry has this advice: 'Always look for condition over year or model.'

WHAT GOES WRONG

ENGINE AND TRANSMISSION

The reliability of the 944 engine is legendary. 'I regularly see them with well over 200,000 miles, and presently we're rebuilding one with 350,000 miles,' enthuses David Barker at Gloucestershire-based 944 specialist Augment Automotive. 'As long as the oil pressure is good they'll go on for ever. Just check that it doesn't smoke under load.'

The motor does of course have its issues, oil leaks being the most common, particularly from the crankshaft seals where the balancer shafts (which counter rotate to reduce the inherent vibration of a big four-cylinder) mount. In advertisements you may see the wording "belts done", which refers to the rubber belts that run the camshaft and the balancer shafts. This is essential 30,000–40,000-mile maintenance: 'You want to know that any 944 has had these done in its recent history,' Barker advises. 'It's a simple job but you need to get the belt tension correct.' If there is any hint of a problem with the water pump, he recommends changing it at the same time because once the belts are off it is effectively a labour-free job.

Regardless of model, a 944 is quite likely to need its cylinder-head gasket replaced if

SPECIFICATIONS

Porsche 944 (coupe)

	944 Lux	944 S*	944S2	944 Turbo	944 Turbo**
Engine (cyl/cc)	4/2479	4/2479	4/2990	4/2479	4/2479
Power (bhp/rpm)	158/5900	187/6000	208/5800	217/5800	217/5800
Torque (lb ft/rpm)	155/4500	170/4300	207/4100	243/3500	243/3500
0–62mph (sec)	8.4	7.9	7.1	5.9	5.9
Max mph	135	142	149	161	161
Average mpg	29.7	30.5	27.5	28.2	28.2
Weight (kg)	1260	1280	1340	1400kg	1400kg
Built	1982–1988	1986–1989	1989–1992	1985–1992	1985–1992

*post September 1987 **944 Turbo SE 247bhp/259lb ft

Maintenance costs (guide price, including fitting and VAT)
 Replace cylinder-head gasket £1800
 Rebuild turbo system £2160
 Fit new camshaft and balancer shaft belts £600
 Replace water pump £300
 Front brake discs and pads £480
 Augment Automotive replacement ECU £1380
 Replace body sills (per side) £1680
 Four premium brand 195/65 VR tyres £200
 Annual service, normally aspirated/Turbo £240/£260

Prices supplied by Augment Automotive (01452 831710, augmentautomotive.co.uk)

USEFUL CONTACTS

Augment Automotive
augmentautomotive.co.uk
Well established workshop in Cinderford in Gloucestershire with deep specialisation in four-cylinder, front-engine Porsches. Offers useful modifications for ease of ownership

Hartech
hartech.org
A 924/944/968 specialist based in Bolton that goes back many years. Provides all workshop facilities including complete engine rebuilds

Porscheshop
porscheshop.co.uk
An essential entry in 944 owners' address books, be they aiming to maintain their car or modify it, the Midlands firm's parts catalogue for this era of Porsche is vast

9apart
9apart.co.uk
A business in Lancashire that is a great source of used parts, for example interiors, that can no longer be purchased new

Design911
design911.co.uk
This Essex-based specialist caters for the "real world" Porsche owner, and holds a very large stock of parts

Euro Car Parts
eurocarparts.com
Branches all over the country and with plenty of 944 service parts and more

this has not been done so far. It tends to leak through the water jacket, and does not blow as such, rather the engine loses coolant at its rear, which then become very hot. In the initial stages it's not easy to spot.

On 944 Turbos, the turbocharger can leak oil, and the best way to check this out is to remove a pipe from the air-to-air intercooler (on top of the engine), and if you see oil inside the pipe, a new turbo is in order. 'The engine probably won't be down on performance, and in any case you'd have to know the car very well to notice if it was,' Barker explains. The wastegate can also suffer, with cracked valve seats.

The gearbox is durable, so accept any whines from it as excusable after quarter of a century or more. However, if the clutch for the rear-mounted gearbox is worn out, budget for a grand as its position makes replacement a long-ish job.

SUSPENSION

The aluminium suspension arms that came with "oval dash" 944s in 1985 stored up added expense for future owners, as, unlike the original cars, the ball joints cannot be removed, rather the entire assembly must be replaced. 'When the bushes wear out the handling goes floppy and there will be probably be a lot of clunking going on,' Barker explains. The alloy parts are expensive, but cheaper alternatives are to be found in the independent Porsche parts business.

Cars with the M030 sport suspension ride more stiffly, but Barker says the sport dampers on their own don't make much difference. 'When replacing shock absorbers we always use Konis,' he says. The bushes on the front suspension wear out, at which point you have the choice of replacing them with Porsche originals or independently supplied items such as from Powerflex.

BRAKES

As consumables, brake discs and pads eventually need to be replaced, but to keep the cost down, Barker recommends discs from the brake specialist Pagid, which supplies original equipment spec items. It is quite likely that the calipers will have partially seized and will need to be taken apart and

cleaned. 'We do that on almost every car we have in for discs and pads,' he says. 'The symptom is braking that feels very springy.' Note that the Turbo has Brembo calipers that do not suffer the same problem, but should the calipers need to be replaced they are much more expensive.

ELECTRICS

The 944, with its Bosch fuel-injection, was of an era when car electronics were much simpler, and electrical problems tend to reflect the sheer age of the car. 'The underbonnet loom has been on top of the engine for all these years and is probably baked hard,' warns Barker, adding that Augment Automotive supplies its own replacement looms.

The other likely problem is the air flow meter which is regulated by the ECU (a fairly simply affair, but an ECU nonetheless). The meter's flap system can wear out, in which case the engine will suffer flat spots at certain points in the rev range, and generally erratic running.

A cure using original parts is possible but expensive, hence Barker's solution is to supply his firm's own replacement, which is effectively a "plug and play" replacement ECU that is available mail order, and which can be easily installed by an owner with even modest DIY skills. Then there is the infamous DME (digital motor electronics) relay within the fuse box which, once faulty, takes out the fuel pump. This may sound a serious fault, but independently made replacement DME relays of suitable quality are inexpensive and easily fitted; a seasoned 944 owner will probably carry a spare in the car.

BODYWORK

Barker is fulsome in his praise for the 944's bodily longevity, the galvanised metalwork able to last extraordinarily well. But there are two well known rust traps: the bottom of the front wings, and the side sills. The first issue is easily dealt with by a competent body shop, however the second is more complex. 'The sill is the longitudinal strength of the car and is welded to the torsion tube at the rear – sometimes you see badly repaired cars where sections have simply been welded on

top of the rusty sills,' says Barker, 'and for some reason the problem is more common on oval dash cars.'

One tell-tale sign is to look for the vertical seam that extends from the rear of the door down to the bottom of the sill – if this can't be seen, a sub-standard repair may have been carried out. This really is a most crucial check, because if the sill is extensively rusted a proper repair is likely to be up to £1500 a side.

INTERIOR

A 944 interior is quite likely to be tatty, but the only cost effective cure is to install the seats and trim from a better example. The dashboard on the "square dash" models is prone to cracking across the top. 'It's sunlight damage, and it mainly affects early cars, but you do see it on oval dash cars, too,' says Barker. One modification he recommends is to fit later seats, these mounted lower in the car and offering what he feels is an improved driving position.

VERDICT

Despite lacking the flair and sexiness of the 911, the 944 was a design of immense integrity and solidity, which has served it well into old age and also resulted in a high survival rate. Prices can go only one way, but for the moment the 944 remains an excellent "first Porsche" that can be bought for almost absurdly low prices.

However, its affordability is a double-edged sword in that on strictly financial grounds it is not worth spending serious money on repairs and renovation, as it would not be long before a 944's value was exceeded. All the more important, then, to ensure that the car you buy is the best car your budget will stretch to, because this is a cheap Porsche to enjoy in the now so forget thoughts of it being an investment – for a year or two, at least. PW

WHAT THE PRESS SAID

'At one end of the scale the Porsche can trundle along in town traffic in top, its superbly flexible engine giving miserly fuel figures, and at the other, the same gear will sweep the car to a maximum of 140mph with a minimum of fuss.' *What Car?, October 1983*

'The S2 turns into bends with precision and balances delicately on the throttle. The consistent nature of the S2's delivery, its instant access to vast, muscular reserves whatever the revs, will make it clear favourite for those who enjoy searing progress without effort.'

Autocar, March 1989

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Private seller
1988/E 944, black, part-leather, five owners, part service history, 120,000 miles, £2495, Glasgow

General used car dealer
1985/B 944 Lux, red, part-leather with chequered cloth trim, part service history, 65,000 miles, £4995, Somerset, crosskeys-garage.co.uk

Sports car specialist

1991 944S2, white, two owners, full service history, 71,000 miles, £11,750, Helensburgh, Scotland, classicandperformancecars.co.uk



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P0116/010



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P0116/014



Carrera 4S Cabriolet manual 2005

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P0116/038

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davidmdrury@virginmedia.com (Surrey).
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P0116/036



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Free UK delivery, stunning 964, full RS spec, suspension, brakes etc, RS clutch and flywheel, supercharged, rebuild by Ninemeister, 8 page mag feature in 911 & Porsche World, completely mint condition and massive history from new, special factory order colour, white leather, contact me for more pics and video footage, one of the best 964s available and a very special car, visit woods911.com. Tel: +44(0)7908 588962. Email: ciaran98@aol.com.

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Porsches bought & sold

DEALER TALK: PARAGON

He's sold Porsches for 22 years, raced them and has owned a Carrera GT since new. Mark Sumpter, of East Sussex-based Paragon explains his passion for the marque



How long have you been in the Porsche business?

We started Paragon in 1993, but my history with Porsche goes back much further. In a previous job, we used to service them and I grew to love how well they were thought through mechanically, and of course how well they drove.

I ended up as a very keen owner of a 911 2.2E and then a 911 Turbo, so I guess my path was mapped out as soon as I got behind the wheel of my first Porsche and experienced both the thrill of the drive and the thrill of ownership.

What Porsches do you specialise in?

Paragon is a company made up of genuine Porsche enthusiasts, so we carry a full range from the simplest Boxster through to some highly collectible classics. If the car itself is exceptional, we're interested!

What's your cheapest, and most expensive, Porsche presently in stock?

We have a 2005 987 Boxster S in GT Silver and with 51,159 miles at £16,995, and the most gorgeous 356 Speedster I have ever seen, a red left-hand drive 1956 car that underwent an unhurried and meticulous

restoration between 2000 and 2010, at £349,995.

What would you recommend as the best "first Porsche" to buy?

That's more about the person than the car. Across the range, you can take great pride in ownership and have a great deal of fun. Whether you're climbing into a Boxster or a 911 Turbo S, you're pretty much guaranteed to enjoy the experience.

We've had customers who started their Porsche ownership with us by buying a Boxster and then continuing on over the years "up the ladder" and they now own some very special 911s. Some customers, of course, start right at the other end with a classic. We try and match the right car to the right driver.

Where do you get your stock from?

We acquire stock from customers who are coming back to us to buy again, occasionally from specialist dealers, and we are often approached by owners with high quality cars to sell.

What warranty do you give, or sell?

We offer a comprehensive 12 month/12,000 mile full parts and labour warranty with each car we sell. It's included in the

price, and it offers great peace of mind. Owners can extend of course, at a cost, and many choose to do so.

What's "hot" at the moment?

So many models have become very collectible, especially air-cooled 911s and specialist models such as the 996 GT2. The pinnacle has to be the 964RS – it just keeps getting more and more desirable as time goes on.

What's best value at the moment?

I think you get a lot of car for your money with an early 997-series 911, and if you can stretch to a 997 Turbo, you'll own one of the all time greats.

Name a car that you recently sold, that you would happily have kept for yourself?

It could be one of several! But I suppose it would have to be a rare 911E 2.2 – I couldn't drive it without a big smile on my face, it was so full of character.

What are your plans for the future?

At Paragon, we are going to keep it simple and focus on doing what we do best – selling great cars and great service, and keeping our customers happy. That's the limit of our ambition! On a more personal level, over the last couple of years I've been helping customers acquire some very special cars which has meant quite a bit of travelling and a lot of research. I think that the years of working with, driving and racing Porsche have, if anything, made me even more enthusiastic, and it gives me a lot of pleasure to work in this way. So whatever the future holds, it's going to be very Porsche focused!

Contact

Paragon, Five Ashes, Mayfield, East Sussex TN20 6HY
paragongb.com



HELPING YOU BUY YOUR PORSCHE THIS MONTH:

NEW CONSUMER RIGHTS

When you purchase your used Porsche, you may well work on the assumption that if you get it from a used car dealer it will come with a warranty. But the actual level of protection has always varied widely, from a vague 'bring it in and we'll look at it' promise to a fully documented policy providing years of cover. However, as of 1st October 2015, things changed in favour of the buyer, when the Consumer Rights Act 2015 replaced the old Sale of Goods Act, making dealers' obligations much more clearly defined. If the Porsche 911 you bought decided to trash its IMS (intermediate shaft bearing), as some do, then under the previous legislation the dealer would be legally bound to repair it if it failed within 30 days of purchase. Now, though, you are entitled to return a problematic car to the dealer within 30 days and receive a full, no questions asked refund. Additionally, you have the right of one repair within six months.

Of course, Porsche specialists with a reputation to protect are going to bend over backwards to keep customers happy, and we imagine that for most buyers, the desired outcome would be to have the problem rectified, and keep the car. But in the small number of cases where push comes to shove, the customer now has that useful extra leverage.

What it means to you? You are now legally entitled to a full refund on a faulty car for a month after purchase.



BUYING TIP OF THE MONTH

So you want to buy a used Porsche. But which one? On, for example, the Auto Trader site you'll find approximately 1200 911s and 800 Boxsters – such a vast choice makes it tricky knowing where to start. Knowledge is the key. Research the model and the market, and the number of suitable cars tumbles. Let's say you're budgeting £10,000 for a mid 2000s 987-model Boxster S, and have discovered that cars registered before 23rd March 2006 attract £290 road tax, £200 less than if registered a day later. Work that factor into the Auto Trader search and, when we did it, the number dropped from 156 to 82 cars. Manual gearbox only? That took out another 31, and imposing a 50,000 mile limit left 31. Heart set on a black one? Just 16 left, and if you wanted to buy privately there were six, a convenient shortlist. The more you know about what you really want, the more easily you'll find it without needlessly criss-crossing the country.



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P0116/027

944

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P0116/044

944



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P0116/042

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P0116/041

Boxster 986

2.7 manual, low mileage 41,000, FSH, MOT due September 2016, has travelled only 1100 miles in five years, elderly owner, as new condition. Tel: 07897 530301. Email: mercedes.reeves250@googlemail.com (West Sussex).

£7995

P0116/028



Midnight Blue 968

968 manual Coupe, Midnight Blue with grey leather interior, owned by me for last 6 years, 194,525 miles, MOT March 2016, excellent to drive and in good condition, Hartech engine rebuild with Gold service and full report in March 2011 20,000 miles ago, new clutch 25,000 miles ago, power steering pump replaced 500 miles ago, part respray by Porsche body shop, wheels refurbished in 2014, small rip to passenger's seat, full folder of receipts and MOTs, car is located in the NE of Scotland. Tel: 07730 487645. Email: roynbaker@sky.com.

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P0116/045

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AUCTION/SHOWROOM/CLASSIFIED

MARKET WATCH

This month we examine the new phenomenon that is shaking up the used Porsche market – the rise of the “young classic”



928 is the epitome of the 'young classic'. This low-mileage example sold for £54,995

Do you know the meaning of the terms “youngtimer”, “young classic” and “modern classic”? Used car dealers certainly do, because they are white hot at the moment, one of the fastest appreciating categories of collectable cars.

The title youngtimer originates from Germany, and in the UK it's the name young classic that is most often used. It refers to models that are not quite full on classics but more than simply old cars. They have come to prominence through a combination of an era when build quality and longevity are fondly remembered as excellent, and a demographic of nostalgic buyers ready to buy them.

The definition varies according to marque. With Mercedes-Benz, for example, the young classic period stretches from the early 1970s when 1960s designs gave way to the more modern and still recognisable look that you can see in some current Mercs, to the early 2000s when the last of the super solid models, the R129 SL

was discontinued. In Porsche's case the breed is more sharply defined, from the arrival of the 1975-season “Impact Bumper” 911s to the last of the air-cooled models, the 993, which bowed out in 1998.

A visit to the Classic & Sports Car London Show at Alexandra Palace at the end of October was a reminder of how far, and how quickly, the young classic market has come in the last two or three years. On the stand space taken by Hexagon Classics, a London based dealer, stood a 1993 928 GTS offered at £54,995 – the price of a four-year old 991-series 911. Granted it is in pristine, original condition and with just 14,250 miles, but nonetheless this is a massive price for what until quite recently the “forgotten” Porsche, and which is still typically priced at under £10,000 in the classified adverts. And back in its Chelsea showroom, Hexagon had another 928, this one £5000 more, while its Ally Pally stand also accommodated a 1983, 8100-mile 911SC Sport

Targa up for £89,995.

‘People who wanted these cars as kids now have the cash to buy them,’ explains Hexagon's Jonathan Franklin. ‘They want to reminisce. Will we sell the 928? Oh yes!'

Inflated prices of cars like these cause some resentment among those who want to buy them but have been priced out of the market. Franklin's view on that is simple. ‘We're often criticised for the prices we charge, but increased values mean that these cars are now being properly maintained.’

Hexagon doesn't have the monopoly on expensive 928s, however. Northampton-based prestige sports car dealer Dove House Motor Company has been asking £39,995 for a 1992 GTS with 21,500 miles, while Carlians in East Horsley in Surrey has priced a 1993 GTS with 112,500 miles at £29,900, reminding those viewing its advert that ‘the value of these cars seems to be going up and up’!

A few days before the C&SC event, a dedicated Porsche auction hosted by

Silverstone Auctions, at the Silverstone circuit and supported by Porsche Club Great Britain, also underlined the rise of the young classic Porsche. With nearly 60 Porsches offered, and 70 per cent of them sold (raising over £2.7m), an interesting snapshot of the present market trend was provided.

Although far from the most expensive Porsche sold on the day (that being a 1973 911 Carrera 2.7 RS Touring, for £410,625), the stand-out lot for students of the youngster market was a late 944S2 Cabriolet that made £27,560. Now that is still way below its original list price of £41,100 (almost £77,000 in today's money), but even with just 18,900 miles and two owners that is an incredible price for the type of Porsche that on a good day normally makes £10,000. Silverstone Auctions believes it to be an auction price record for such a model. Apart from its top condition, its complete maintenance history went in its favour – as recently as August 2015 it had been serviced by Porsche Centre Bournemouth.

However, this one result is unlikely to signal the end of the four-cylinder, water-cooled model as the “cheap Porsche”. A late, 1986 924S with 115,000 miles and bills for a £4000 glass-out respray, and a full history at renowned Porsche specialist Autofarm, was sold for £5625, a little below its lower estimate. Hexagon's £90k asking price for an exceptional SC wasn't merely an ambitious experiment, other results from Silverstone suggest. A red 1981 911 Turbo (which Porsche Centre Leeds had restored for the 2014 national “50 Years of the 911” restoration competition, and which won two class prizes)

was sold for £118,125 which was over £3000 above its top pre-sale estimate. Price wise, 930s have gone stratospheric recently, especially in the high profile US summer auctions, so the £39,375 paid for a 1979 29,500-mile 911SC coupe looked like something of a bargain.

If you were looking for a “cheap” air-cooled 911 at Silverstone, the 1983 911SC Cabriolet that went under the hammer for £16,750 was it, although, interestingly, this was £1250 under its lower estimate. That's pretty much rock bottom for a 911SC or Carrera 3.2 these days – a more typical price in the classified columns is £20,000–£25,000.

So for those who have missed the boat on affordable air-cooled 911s, what is the next Porsche to buy before it is swept away by collectors' money? The answer, many would say, is obvious – 996s, and especially the higher end examples.

In fact already the 911 GT3 RS, with its white paintwork, big rear wing and stripped interior can be ticked off the list, as evidenced by the 2003, 3277-mile example Silverstone Auctions sold for £142,875 – that's close on £60,000 more than was paid for it new just 12 years ago. A second 2003 GT3 RS, this time with 26,889 miles, went for £112,500, so it looks like modern RSs will in the fullness of time be the same blue chip investments that the early 1970s originals are. Such high prices made the 2002 996 Turbo – with full history and a not excessive 72,250 miles – seem an outright bargain at £25,880. How long will 996 Turbos be available at this price? Not for long, is probably the safest answer. PW

Silverstone 944S2 Cabrio: £27,560



Silverstone 911SC: £16,750



Silverstone 930 Turbo: £118,125



Silverstone 996 Turbo: £25,880



Silverstone 996 GT3 RS: £142,875

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P1015/048

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TRIED & TESTED

With 911 & Porsche World's consultant editor, Chris Horton

BOXSTER 'S' (986) 2000/W 67,560 MILES £7250

I just never thought to ask 911&PW contributor Ken Coad the colour of the 986-model Boxster 'S' he was showing to potential buyers on behalf of his friend Pete Bartley at nearby Kings Langley Autocraft, and which he had quite reasonably enquired if we might feature as one of our *Tried & Tested* stories – although maybe the fact that Pete is a bodywork specialist of considerable repute ought to have hinted at something a little out of the ordinary. In truth it would have made no difference – a Porsche is a Porsche, and this one sounded worth a look in every other respect – but, even so, it was naturally quite a surprise when Ken hauled open his garage door for me.

So why pearlescent pink? 'I bought the Boxster for my daughter to drive while she was at university,' explained Pete later. 'It was basically straight and clean, but the paint was tired, and since I spray cars for a living we decided that it might as well have both a repaint and a colour change. But now she is off to Australia very soon, and obviously won't be able to take it with her! That sounds reasonable enough – and there is no denying the quality of the work: barely a mark to be seen (it was finished in 2012, some 5000 miles ago), a smooth, glass-like finish throughout, and not least the attention to detail that could make this a factory job. (And the colour is not so very far from Porsche's iconic Rubystone Red.) You will look long and hard to see even the merest hint of the original Ocean Blue.'

The split-rim wheels have been fully refurbished with equal care and precision, and I like the black-plastic caps covering (hiding?) their five presumably corroded securing bolts apiece. Very neat. The colour-coded brake calipers are arguably a step too far, but they would be easy to repaint again if necessary – ditto the central tunnel finisher. Elsewhere inside the cabin the handbrake lever is rather worn, and both the ashtray and the lid for the small storage tray at the rear of the tunnel are predictably frail, but the gear knob and steering wheel are OK, and likewise the old-style mechanical levers for the front and rear lids (both of which have good struts, and open to reveal clean and tidy luggage compartments beneath). The black leather seats are inevitably



a little patinated, but otherwise good, and likewise the carpets, protected by black overmats. The hood is excellent: a nice, deep black on the outside, with fully intact tensioning cables over the doors, an unmarked headlining, and only moderate creasing of the plastic rear window.

Look a little deeper and it's the same encouraging story. No leaks from the engine or gearbox, no obvious scrapes on the floorpan or undertrays, and even the all too often partially squashed air-con pipes are fine. No leaves in the air-conditioning condensers, and an encouragingly large and new-looking Bosch battery. Brakes look great, too, with recently renewed rear discs and pads, and new pads at the front. The engine has also benefited from two recently installed replacement coil packs, we are told, and although on this occasion I didn't see it the car additionally has what is said to be a full service history. There's a nearly new MOT certificate, as well.

It is certainly a lovely machine to drive. Not the smoothest of rides – although the roads around Kings Langley are terrible – but the usual willing performance of any good 986-model 'S', and a particularly nice clutch and throttle action. I am not sure whether that would ever outweigh (for me, anyway) the distinctive colour scheme, but don't let that put you off. At heart, this highly individual Boxster is a gem. **PW**

Pete Bartley's 2000-model Boxster 'S' was originally painted a boring dark blue, but as a well-known Porsche body specialist it was perhaps only natural that he should give it a complete colour change – partly for his daughter's benefit while she drove the car at university, but also to showcase his considerable skills.

The split-rim, 18-inch Sport Design wheels were fully refurbished, too, and even the brake calipers colour-matched to the body.

That apart, it's basically a standard 986 with a six-speed manual gearbox, black leather seats with electric backrest adjustment, and a

Porsche CDR-22 radio and single-disc CD player. There is also the optional wind deflector between the two roll-over hoops, and the rather shallow but none the less useful storage compartment behind the seat backs.

Both front and rear light units are the post-2002 facelift items with clear (as opposed to orange) indicator lenses; they suit the distinctive colour scheme perfectly. More recent work includes rear brake discs, and pads all round, plus two new coil packs (a common Boxster problem). Passenger door wouldn't open at the time of our test,

but that, too, is a fairly common issue, to be rectified by the time you read this

CHECKLIST

BACKGROUND

An essentially standard pre-facelift 986-model Boxster 'S', but with the obvious benefit – or not – of a complete colour change from the original Ocean Blue to pearlescent pink. Also has the front and rear light units (ie with clear rather than orange indicator lenses) of the later 2003-model cars. Recent new brakes and two coil packs, a full service history, and not least a long MOT

WHERE IS IT?

The car, as we have said, belongs to Porsche bodywork specialist Pete Bartley, but is his own personal property, and thus comes with no kind of warranty. Further to distance it from Pete's business, it is being stored for him by Ken Coad – 911&PW contributor and 968 owner of this parish – at the other end of Kings Langley in Hertfordshire. To make an appointment to view, e-mail Ken at coadspeed@btinternet.com

FOR

Relatively low mileage, a reasonable specification, and even if sold without warranty comes from someone who demonstrably knows Porsche bodywork inside and out. Not a bad price, either

AGAINST

Not a great deal apart from the colour scheme – and if you have got this far through the story then even that is probably not a major consideration. The cabin could do with a good valeting session – and some of the fixtures and fittings are showing their age – and it won't be too long before you need some front tyres. Other than that, good to go

VERDICT

Plainly that distinctive colour scheme is always going to limit the car's appeal, but to dismiss it for that alone would be to miss out on what appears to us to be a remarkably sound – and certainly affordable – Porsche. Even this writer quite liked it after a few hours with it!

VALUE AT A GLANCE

Condition	● ● ● ● ●
Price	● ● ● ● ●
Performance	● ● ● ● ●
Overall	● ● ● ● ●



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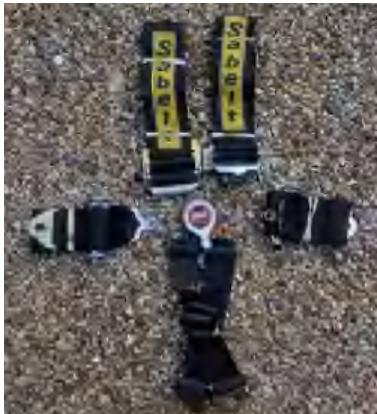


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P0116/035

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THE WAY WE WERE

TIME MACHINE

A nostalgic look back at 911 & Porsche World from days gone by

JANUARY 2015 (ISSUE 250)

Oordinarily we like to use the Time Machine slot to travel a little bit further back into our Porsche past, but there is significance in going back just 12-months, to January 2015, because it allows us to revisit our 250th issue. And time, they say, is a great healer, which it must be because looking at issue 250 now, we've seemingly forgotten what a complete bugger it was to put together, not least because we decided to implement a full redesign, too.

Such celebrations can be somewhat self-indulgent, but we went ahead anyway. Actually, it was a fascinating process, largely because it enabled us to chart the progress of both 911&PW and Porsche, too. Kind of obvious, really, but we've both come a long way, although it could be argued that Porsche perhaps that little bit further. Indeed the relationship between the mighty Porsche – the world's most profitable car co – and 911&PW could be compared to that of a great white shark and the small fish that always seem to be in tow, feeding off its mighty bulk and sort of preening it!

So in order to look back over 250 issues (and 25 years, as it turns out), we split the time-travelling into five year chunks, starting with 1990 to 1995. The Porsche world really was a very different place back then. For a start Porsche only made three models – the 944, 928 and 964. In recognition of this fact we gathered such a trio together and reflected on rather simpler times. Indeed, it's only when you consider what was to come that you realise just how simple, but then looking back is easy, while looking forward is rather more challenging.

The first five years or so of 911&PW were quite quiet,

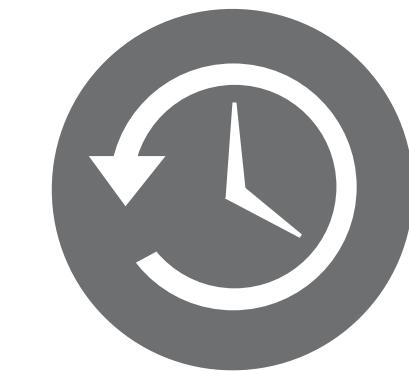
JANUARY 2007 (ISSUE 154)

Now, that's a front cover! A bright red '74 3.0 Carrera RS. Wouldn't be a cover star these days, just too esoteric we feel, and besides we have sister mag *Classic Porsche* for all that old stuff! We jest, slightly, but back then custodian, Mick Pacey, at Export 56, put its value at around £200,000 and that was on the steep side. Now? Double that and add another £50,000 to be safe. That limits its appeal as a cover star for a 'real world' Porsche mag like 911&PW and there's only so much dreaming you can do.

Actually, it was quite a 'dreamy' sort of issue. We had the 997 GT3 RS first drive (still this writer's fave 911 ever), Derek Bell took us for a spin in his 924 Carrera GTS and we looked at early 911s in our comprehensive buyers' guide. The days of the £30,000 2.4S were over, according to Autofarm's Josh Sadler. In 2007 you would need approaching £40k. We couldn't find one in the classifieds, but there was a very nice 2.4E at £19,995 and an on trend (now, that is) 911T Targa at £13,750 and – get this – a real Ruf CTR 'Yellowbird' at £80,000. And it wasn't that long ago!



then along came Wendelin Wiedeking to sort Porsche out and turn it into a profitable car manufacturer and we had a ringside seat. He introduced modern production techniques, the massively successful Boxster and then the water-cooled 911, which shared parts with the Boxster. With Wiedeking at the helm, Porsche spotted the Cayenne niche (copied by all prestige manufacturers now), and went from boom to bust. Us? We just swam alongside!

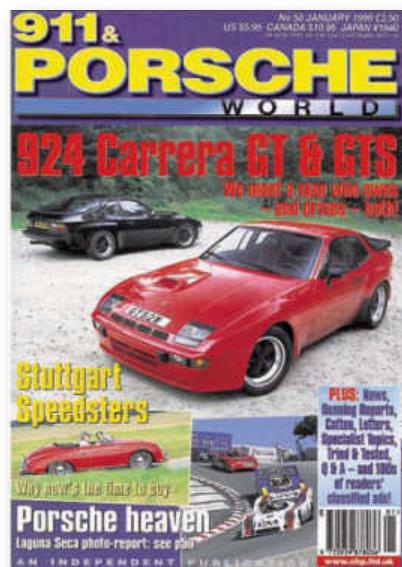


JANUARY 1999 (ISSUE 58)

Journeying into the 911&PW past never fails to bring up parallels and here's a good one. In the Jan 1999 issue (that's 204 issues back in time), then Editor, Chris Horton, reported in his Editorial column, that Porsche had pulled the plug on its GT and Le Mans programme. This bombshell 'clattered in over the fax machine' and was something of a shock to all. It was intended to be a sabbatical, with a back to basics return in 2000, but as we know that never happened and the 2000 car ended up as the road-going Carrera GT. Yes, Porsche return with an LMP2 car, with Penske Racing in 2007, but it wasn't a full factory effort, and while successful to a degree, with no hope of overall wins, it didn't really fire up the fans.

Fast forward, then, to this very issue and we're celebrating Porsche's triumphant return to sports car racing, having won Le Mans this year and wrapped up the World Endurance Championship with the Hybrid 918 (there was no 'clattering of faxes', more like Twitter and Facebook bombing), with a specification that would have seemed positively space age in 1999. It's staggering that we had to wait so long, but perhaps it's all the sweeter for that.

Back to the Jan '99 issue and featured on the front cover the 924 Carrera GT and GTS, a tougher looking pair of Porsches it's hard to imagine, with their bolt-on arches and bonnet scoops. These two cars belonged to the same lucky chap, Jon Beck. Wonder if he's still got them? Jon, if you're around, then do let us know.



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